

THE MINING CONGRESS JOURNAL

VOL I

SAFETY-EFFICIENCY-CONSERVATION

No. 10



CARL SCHOLZ

Who was elected for a third term as president at the recent convention of The American Mining Congress

OCTOBER, 1915

PUBLISHED BY
THE AMERICAN MINING CONGRESS
PUBLICATION OFFICE
MUNSEY BUILDING WASHINGTON, D. C.

\$ 2.00 PER YEAR

20 ¢ PER COPY

WILMOT ENGINEERING CO.

Works, White Haven, Penna.

HAZLETON, PENNA.

MANUFACTURERS OF

HIGH GRADE MACHINERY

FOR THE PREPARATION AND HANDLING OF

ANTHRACITE COAL

WILMOT RIVETLESS CHAINS for Conveyors
for Elevators
for Car Hauls

LLOYD COMPOUND (HOLLOW
GROUND
TOOTH) ROLLS

PARRISH Flexible
Arm SHAKERS

SIMPLEX JIGS

**handling
crushing
screening
cleaning**

BEST SERVICE—LONGEST LIFE—LOWEST COST OF UP-KEEP

Let us figure with you on your new installation or replacing your old and obsolete ones

THE CANTON
AUTOMATIC MINE DOOR



SPECIAL INVITATION

You will probably visit the Panama-Pacific Exposition at some time before it closes next December.

The United States Bureau of Mines has charge of the Mine located under the Mines and Metallurgy Palace.

This mine is ventilated, and we have on exhibition there four of our mine doors.

These doors are in the actual service of distributing the air thruout the mine.

In this mine are about thirty-five other exhibits of up-to-date mining devices.

We, therefore, extend to you a special invitation to visit our exhibit and see these doors in operation. They are adapted to all mines where mechanical means for air distribution are used.

Address **THE AMERICAN MINE DOOR COMPANY**

Box 42, Mines Building, P. P. I. E.

SAN FRANCISCO, CALIFORNIA.

Or for literature the Home Office at Canton, Ohio.

THE MINING CONGRESS JOURNAL

OCTOBER

CONTENTS

1915

EIGHTEENTH ANNUAL CONVENTION	515
IMPORTANCE ATTACHED TO NEW FINDS AT GOLDFIELD.	517
VOLCANIC ACTIVITY AT LASSEN PEAK	518
CHEMICAL SHOW PROVES GREAT SUCCESS.	521
MANNING ADDRESSES MINING CONGRESS	523
SULPHUR DEVELOPMENT ON TEXAS COAST	529
ENGLISH AUTHORITY PRAISES BUREAU OF MINES	533
EDITING OF GOVERNMENT PUBLICATIONS.	534
CARL SHOLZ ADDRESSES MINING CONGRESS.	535
AETNA CONTRACT CANCELLED FORMALLY	538
HARDER DISCUSSES IRON BACTERIA	539
WOOSTER OIL AND GAS FIELD	541
EDITORIALS.	542
MUNICIPAL COOPERATION.	545
PRACTICAL WORK BEING STRESSED	546
FAY DISCUSSES MINE ACCIDENT STATISTICS	548
NEVADA CAMPS SHOW INCREASED OUTPUT	549
PLATINUM PLAYING PART IN MUNITIONS MANUFACTURE	550
THE MULTIPLICITY OF MINING SCHOOLS	551
ENGINEER RESERVE CORPS.	554
PLACER MINES DATA BEING COLLECTED	556
OBSERVATIONS IN SILVER MINES.	557
TRAFFIC	558
RECENT LEGAL DECISIONS	560
PATENTS	563
MINERAL LAND DECISIONS	566
PERSONALS	567

The American Mining Congress

The American Mining Congress is a voluntary association supported by the dues and fees of its members. It is striving to bring about:

First—Safety and efficiency in mining operations.

Second—Intelligent conservation with a view to the highest development and use of our mineral resources.

Third—The stimulation of investment in practical mining operations by showing that mining is a legitimate business when intelligently conducted.

Fourth—Uniformity in state laws governing mining operations carried on under like conditions.

Fifth—Such federal co-operation through research and investigation as will furnish the basis for intelligent state legislation, and will solve those problems of economical production, treatment and transportation which are essential to an increase in mineral production.

Sixth—The improvement of the economic conditions underlying the coal mining industry.

If you are interested in this work, now is the time to help; do not wait until those who are now carrying the burden have become discouraged.

The appended application blank will show the way. Come in and bring the neighbor who should join this movement. Mail application to

THE AMERICAN MINING CONGRESS

Munsey Building, Washington, D. C.

THE AMERICAN MINING CONGRESS

APPLICATION FOR MEMBERSHIP

.....191.....

I hereby make application for membership in THE AMERICAN MINING CONGRESS and agree, if accepted, to abide by the By-Laws, Rules and Regulations of said organization and to pay the dues required by same.

Name.....

Occupation.....

P. O. Address.....

Recommended by.....

MEMBERSHIP FEE, \$15.00 ANNUAL DUES, \$10.00

To the Members of the American Mining Congress:

Do you know that you are the owners and publishers of the MINING CONGRESS JOURNAL? We trust you will realize the responsibility of this ownership and that you will lend your active assistance in making the Journal a greater success.

Real mining men should be active members. An application blank will be found on another page of this issue.

Associate memberships are designed for those not actively interested in mining, but who are willing to assist a state Chapter of the Mining Congress in helping to develop the Mining industry within the State. All memberships include subscription to the MINING CONGRESS JOURNAL.

Every member of the Mining Congress should undertake to send in at least one application each month. Will you help by having the following blank filled in and mail to this office?

SUBSCRIPTION AND APPLICATION FOR ASSOCIATE MEMBERSHIP
IN THE
AMERICAN MINING CONGRESS

.....191.....

I hereby make application for Associate Membership in THE AMERICAN MINING CONGRESS, and agree, if accepted, to abide by the By-Laws, Rules and Regulations of said organization and to pay the dues required by same. Herewith find \$1.00 fee and \$2.00 dues for one year, including subscription to the Mining Congress Journal (\$1.00 of which is designated as subscription to Journal).

Name.....

Occupation

P. O. Address.....

.....

Recommended by.....

PHELPS, DODGE & CO.

Selling Agents of the
Copper Queen Consolidated Mining Co.
Calumet & Arizona Mining Co.
Detroit Copper Mining Co., of Arizona
Moctezuma Copper Co.

*Electrolytic Copper, Wire Bars, Plates, Ingots
and Cathodes and P. D. Co. Casting Copper*

Cor. Cliff and John Streets
NEW YORK

EDMUND B. KIRBY

Mining Engineer and Metallurgist
918 Security Bldg., St. Louis

Specialty: The expert examination of mines and
metallurgical enterprises.

ELI T. CONNER

Mining Engineer "Coal"

Specialty: Managerial Consultation on Coal Mining
Stephen Girard Building
PHILADELPHIA, PA.

JOHN D. FIELDS

Mining Engineer

Designing and Constructing Copper Leaching
Plants a Specialty

MAXVILLE

MONTANA

Irvington Smelting and Refining Works

*Buyers, Smelters and Refiners of
Gold, Silver, Lead, Copper and Platinum
Ores, Sweeps and Bullion*

Manufacturers of Copper Sulphate

IRVINGTON :: :: :: NEW JERSEY

N. Y. OFFICE—Charles Engelhard
Hudson Terminal Building 30 Church Street

THEO. F. VAN WAGENEN

*Mining Engineer
and
Geologist*

1006 First National Bank Building
DENVER, COLORADO

Herbert Goodall Archie J. Goodall
GOODALL BROS., Assayers and Metallurgists
Smelter Shipments Checked Controls a Specialty
38 South Main Street, HELENA, MONTANA

TOUT & McCARTHY, Butte, Mont.
Assayers and Chemists

Assays, Analysis and Tests, Independent Control Work

HARRIS-STEVENS COMPANY

Engineers, Designers, Manufacturers, Modern Mine Cars
First National Bank Bldg., PITTSBURGH, PA.

SEELEY W. MUDD, Mining Engineer

1208 Hollingsworth Building Los Angeles, Cal.
Code: Bedford McNeill

H. N. LAWRIE

Consulting Mining Geologist

526 Yeon Building

PORTLAND

OREGON

L. D. Bell Phone,
1201 Grant

Cable "Rolyat,"
W. U. Code

SAM'L A. TAYLOR, C. E.

M. Am. Soc. C. E. M. Am. Inst. M. E.

Consulting, Civil and Mining Engineer
506-509 Second National Bank Bldg.
PITTSBURGH, PA.

RUHL & SHANKLIN

Mining Engineers

JOPLIN

MISSOURI

WM. GRIFFITH

Mining Engineer, Geologist

COAL EXCHANGE, SCRANTON, PA.

Specialty—**COAL**. Careful Reports, Estimates, etc.
Interviews by appointment, New York or Philadelphia

GOODRICH

Mechanical Rubber Goods

FOR MINES

Every year for the last forty-six years Goodrich has added to the wealth of knowledge and experience necessary to make

"Everything That's Best In Rubber"

CONVEYOR BELTS

ELEVATOR BELTS

TRANSMISSION BELTS

HOSE—ALL KINDS

PACKING

PUMP VALVES

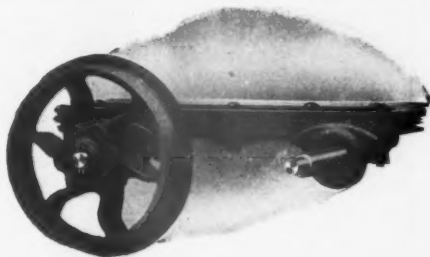
These are but six out of 15,000 Goodrich products that have made good under all conditions of service. They will do the same for you.

The B. F. Goodrich Company

Factories: AKRON, OHIO
Branches in All Principal Cities



Phillips Patent Open Cap Wheel Truck



THE economies that this Truck will effect are real and tangible. The wheels will not wear out internally and are guaranteed in this respect; they seldom break, due to our process of annealing and the high quality of materials used; are thoroughly chilled, and when lubricated with fluid grease will run for six months to a year with one lubrication. This Truck is used at hundreds of Mines, two concerns each using over 10,000, while literally dozens of other companies have found it profitable to discard their old running gear in order to equip their cars with it exclusively. It will pay you to investigate this Truck.

Write for full particulars

Phillips Mine and Mill Supply Company

Manufacturers of

Mine Cars and Trucks — Gravity Screening Equipments — Larry Wagons
Phillips Automatic Cross-Over and Automatic Push-Back Car Dumps

South Twenty-Third Street :: Office and Works :: PITTSBURGH, PENNA.



CONCENTRATOR OF THE INSPIRATION CONSOLIDATED COPPER COMPANY, MIAMI DISTRICT, ARIZONA

THE MINING CONGRESS JOURNAL

Official Organ of the American Mining Congress

EIGHTEENTH ANNUAL CONVENTION PROVES UNQUALIFIED SUCCESS

**American Mining Congress Meeting at San Francisco Calls Together Notable
Assemblage—National Figures Deliver Addresses—Memorial to Dr.
Holmes Impressive Service—Important Resolutions Adopted**

Few of the eighteen conventions which have been held by the American Mining Congress, were more successful than the San Francisco meeting.

There was a fair attendance of members of the Mining Congress, and a very large attendance of scientific men who had been drawn to the California metropolis by the various technical conventions which were being held there about the same time. Officers of the Congress regarded this as very important as it gave men connected with industries bearing a relationship to mining an opportunity to familiarize themselves with the work being done by the American Mining Congress.

Splendid papers were read to the Congress by Van H. Manning, Director of the Bureau of Mines; George Otis Smith, Director of the Geological Survey; William B. Phillips, President of the Colorado School of Mines; Rush B. Butler, of Chicago, Ill.; Fletcher McN. Hamilton, State mineralogist of California; Professor Willis, of Leland-Stanford University; G. H. Dowell, of Bisbee, Ariz.; Dr. F. L. Hoffman, of Newark, N. J.; Harry L. Day, of Wallace, Idaho, and others.

MEMORIAL SERVICE

Without question the feature of the convention was the memorial service held in commemoration of the late Dr. Joseph A. Holmes. This was an impressive service, in which a large number of prominent technical men from all parts of the United States, as well as prominent citizens of San Francisco, joined in paying remarkable tributes to the man who did so much in the interest of all connected with the mining industry.

Resolutions were adopted at the regular sessions of the convention condemning the Federal Leasing system of Western Natural Resources; urging larger appropriation for the work of the Bureau of Mines; recommending active steps to secure closer relationship between employer and employee; urging cooperation with the Federal Trade Commission; asking the directors to provide a discussion at the next session dealing with the advisability of non-partisan tariff commission; and calling for the opening of negotiations for a wage scale in the coal trade not later than January 1.

Carl Scholz, who has served so commendably for two years as president of the American Mining Congress, was reelected to that office by acclamation.

MANNING HONOR GUEST

One of the most pleasing features of the entire convention was the banquet given in honor of Van H. Manning, Director of the Bureau of Mines. W. L. Saunders, president of the American Institute of Mining Engineers, acted as toastmaster. Senator Newlands, of Nevada; Charles E. Van Barneveld, chief of mines and metallurgy, P. P. I. E.; Dr. J. E. Talmage, University of Utah; T. A. Rickard, editor, *Mining Press*, and Dr. John C. Branner, president Leland-Stanford University responded.

Mr. Manning, in a happily-worded speech, thanked those present for the honor that had been conferred upon him, and took advantage of the occasion to assure them that he would spare no effort to bring about better working conditions in mines and to increase the economic possibilities of the industry.

The new directors of the American Mining Congress, elected at the San Francisco convention to fill the terms expiring this year are: Dr. J. E. Talmage, Salt Lake City, Utah; Charles M. Modderwell, Chicago, Ill., and Dr. William B. Phillips, Golden, Colo.

ASSISTANT DIRECTOR OF BUREAU OF MINES NOT TO BE NAMED NOW

No appointment of an assistant director of the Bureau of Mines will be made for several months. One reason for not filling this place at the present time is the desire to husband the Bureau's rather scanty appropriation.

This position is filled by appointment by the Secretary of the Interior. It is understood, however, that the Secretary usually names the person recommended by the director of the Bureau of Mines. It is probable that Mr. Manning will not undertake to consider any one for this place for several months.

MINERS' CIRCULARS ARE TO BE PRINTED IN FOREIGN LANGUAGES

Arrangements have been made by the United States Bureau of Mines for the publication of its miners' circulars in foreign languages. So far as has been decided, the translations will be made into Italian, Hungarian and Slovak. Other languages will be decided upon in the near future.

It is the intention to print the circulars in English and in the foreign language in parallel columns so as to facilitate the acquiring of a knowledge of English. There are 200,000 miners in the United States who do not read English.

GEOLOGICAL SURVEY OPENS OFFICE IN AUSTIN, TEX.

An office of the water-resource branch of the Geological Survey has been opened at Austin, Tex. G. A. Gray has been designated to take charge of the new branch.

Mr. Gray for a number of years was the district engineer of the Survey at Santa Fe, N. Mex., and has a large acquaintance among Western mining men. He also has been a member of the Land Classification Board staff, with duties in New Mexico and other parts of the Southwest.

Lamp Approved by Bureau

The Koehler safety lamp, manufactured by the Koehler Mfg. Co., of Marlboro, Mass., has been approved as permissible for use in gaseous mines by the Bureau of Mines. The only globes so far approved for use for these lamps are those known as Macbeth high-speed, No. 2100, manufactured by the Mackbeth-Evans Glass Co., Pittsburgh, Pa.

PRECAUTIONS TAKEN TO SUPPRESS FACTS ABOUT MOLYBDENUM

The Government has been unable to obtain reliable information as to the amount of molybdenum being used. All users of the metal are adopting the most rigid regulations to prevent knowledge leaking out as to the quantities being consumed. One manufacturer, for instance, has his supply of molybdenum sent to his residence. He personally carries it to the plant, so as to keep the knowledge of the amount used with as few persons as possible.

DOLLAR EXCHANGE IS BEING USED IN NITRATE PURCHASES

New York exchange has taken the place of London exchange for Chilean nitrate sales, according to a report received by the Bureau of Foreign and Domestic Commerce, Department of Commerce, at Washington. Consul General Keena at Valparaiso announces the sale to an American firm of 4,000 tons of nitrate with payment by draft on New York for \$155,000. However, he adds that since there is no American bank in Chile, much of the benefit of the tendency to establish dollar exchange must be lost, as this type of exchange only is favored temporarily by foreign banks.

TENNESSEE IS INCREASING PHOSPHATE OUTPUT DECIDEDLY

Tennessee is increasing its output of phosphate very decidedly according to information received at the Geological Survey.

One of the features of the development of the phosphate industry in Tennessee, is the fact that the product is being conserved by the use of modern mining and milling methods. Formerly, there was great loss due to unsystematic mining methods.

Ellsworth Recalled from West

To take the place of G. A. Gray on the staff of the Land Classification Board, C. E. Ellsworth has been recalled from the Northwest to take up these duties in the Washington office. Mr. Ellsworth has been doing water-supply work in Washington, Oregon, Alaska and the Northwest in general.

He will report upon irrigation and Carey Act projects. He also will assist in making enlarged homestead designations.

Studies California Copper.

B. S. Butler, in charge of copper investigations for the Geological Survey, has returned from the copper mines of northern California, where with L. C. Gratton he has been conducting investigations for the past several weeks. In addition, Mr. Butler looked over the Promontory zinc deposits in Utah. He also visited the tungsten deposits at Lucin, Utah.

IMPORTANCE ATTACHED TO NEW FINDS AT GOLDFIELD

F. L. Ransome Returns from Important Inspection Trip through Western States

An extensive trip through the West just has been completed by F. L. Ransome, of the Geological Survey. At Goldfield, Nevada, he found that in a general way results of deep mining have confirmed those obtained during the study of the district in 1905-08. A number of deep workings have gone through the volcanic rocks into the Cambrian shale.

The shale in most places seems to mark the lower limit of the ore bodies, although one mine is at present producing high-grade ores from stopes in Cambrian rock.

While Mr. Ransome considers it entirely possible that ore bodies may be found in the granite below the shale, yet, owing to the irregular character of the contact between the granite and shale, it would be difficult to predict the depth at which this contact will be reached. Such ore, if present, would be found to be of comparative low grade and probably would be expensive to mine.

Encouraging features of the present development at Goldfield, Mr. Ransome finds, are the discovery of ore in the Atlanta ground and at the Kewanas. The latter property is the most northerly in the group of mines adjacent to Goldfield.

Mr. Ransome also visited Manhattan, where H. G. Ferguson, of the Geological Survey, is making a detailed geological map and is studying the lode and placer mines. Mr. Ransome spent two days in conference with Mr. Ferguson and in examining this district. He also went over the general quadrangle work in that section.

The Napa quadrangle is being mapped by Prof. C. F. Weaver, of the University of Washington, in cooperation with the geologists of the University of California. The quadrangle contains a few quicksilver mines, none of which is active at the present time, however. The U. S. Geological Survey will publish the result of this work as a geologic folio. Mr. Ransome visited this area and consulted with the geologists engaged in the work.

The Tesla, San Jose, Pleasanton and Mt. Hamilton quadrangles also were visited by Mr. Ransome. These quadrangles have been mapped geologically by the professors and students of geology and mining at Leland-Stanford University. These maps, with descriptive text, will be published by the U. S. Geological Survey as a folio. The region contains one active magnesite mine and some manganese prospects.

Coal was mined extensively for many years at Tesla. Large pottery works utilized the fire clay mined in connection with coal. Owing to the competition of California oil, the mines have been idle some years.

With Dr. Ralph Arnold, Mr. Ransome examined the Ventura, Santa Paula and Hueneme quadrangles which have been geologically mapped by Dr. Arnold and assistants. These maps will be published as the Ventura folio by the Geological Survey. The region contains a number of active oil fields, and shows in a very interesting way the relation of oil occurrence to geological structure.

Near Santa Paula, the Montebellow field is a very active producer of high-grade oil from a well-defined anticlinal dome. This oil is accompanied by considerable gas, which is being impressed upon the ground into gasoline.

F. J. BAILEY APPOINTED CHIEF CLERK OF BUREAU OF MINES

Owing to the long absence of the late Dr. Joseph A. Holmes prior to his death several features in the organization of the Bureau have been left unsettled.

With the appointment of Van H. Manning to the directorship, work of getting the staff into permanent shape has begun. The first step in this direction was the appointment of F. J. Bailey as chief clerk. He had been discharging the duties of this position since the departure of Dr. Holmes for the West.

While Mr. Bailey is from Vermont, he has a very wide acquaintance among mining men. He is particularly well known in New Mexico mining camps, where he has had occasion to make a number of trips in the discharge of various missions connected with the work of the Bureau of Mines.

Mr. Bailey was born at Groton, Vt., in 1878. In 1901 he graduated with the degree of bachelor of arts from Middleburg College, Vt., and in 1910 he became a graduate of the law department of Georgetown University. He first entered the Government service in the Philippine Islands as principal of the provincial secondary school at Oriental Negros, where he served from 1901 to 1905. In the latter year he became private secretary to the late Senator Proctor. He held this position until 1908, when he became clerk to the Federal Immigration Commission, remaining there until 1910, when he became private secretary to the late Dr. Joseph A. Holmes. In 1914 he was made assistant chief clerk.

PROF. HOOD ACTS FOR DIRECTOR OF THE BUREAU OF MINES

During the absence of Van H. Manning, director of the United States Bureau of Mines, Prof. O. P. Hood, of Pittsburgh, chief mechanical engineer of the Bureau, acted for the director. Professor Hood was for many years a member of the faculty of the Michigan College of Mines.

Mr. Manning attended the convention of the American Mining Congress, as well as that of the American Institute of Mining Engineers.

VOLCANIC ACTIVITY AT LASSEN PEAK ABOUT OVER, GOVERNMENT GEOLOGIST THINKS

Dr. J. S. Diller Returns from Detailed Study of Only Active Volcano in United States Proper—Period of Activity of California Mountain Nearing Close, He Thinks

One of the recent events of most interest to American geologists is the volcanic activity which is taking place at Mount Lassen, California. Dr. J. S. Diller, of the Geological Survey, who was detailed specially to study this activity, has just returned from Mount Lassen with a large supply of data and an interesting collection of photographs.

Volcanism is a study which has attracted wide interest since the earliest times. It has proven baffling, however, in so far as the origin of volcanic activities is concerned. There is little definite knowledge even as yet in regard to many of the salient features in connection with volcanic activities.

The old theory that volcanoes are vents of the molten center of the earth, has been exploded. There is no question that the activities often times have their origin in a molten mass, but the size of the mass is a matter which has never been determined in any particular case of volcanic activity.

In the case of Mount Lassen, there is no question that it is a pure type of active volcano, but the amount of volcanic activity has been limited, as compared to the better known volcanoes throughout the world.

ACTIVE OVER A YEAR

It has been active since May 30, 1914. The most important eruption took place May 22, 1915. There have been, however, more than one hundred different explosive eruptions. During these eruptions there have been no distinctive flows of molten material in the manner which is so well exhibited in the volcanoes of Hawaii, Alaska and Italy.

A mass of lava did appear on the top of Mount Lassen and filled the crater that was formed during the first year of its activities. At the present time, the volcano, instead of having a well-marked blow-hole, is capped by a small, flat area. The lava which came out formed a table which made a lid over the former depression between the two peaks on the top of the mountain. Indications are that the mountain will not be so active hereafter.

The latest developments are at the northwest corner of the mountain and it is not easy to predict the outcome.

During his recent visit, Dr. Diller was accompanied by Dr. Arthur L. Day, the director of the geophysical laboratory of the Carnegie Institute. Dr. Day was assisted by P. S. Shepherd. They spent the greater part of July studying the activities of the peak, and a considerable amount of material was collected.

There was a great deal of heat present in the mass of material which was thrust up by

the mountain. A great volume of snow was melted and the resultant water swept down the mountain side. Trees were carried for miles and much soil was washed up and deposited in the valley. This led to the early reports that there had been an extensive lava flow, but Dr. Diller's investigations show that what had been classed as lava was entirely material from the outer surface of the mountain.

The lid which formed over the crater directed the blasts of hot gas downward. The force of these blasts were so great as to break off trees at a distance of two miles from the crater. The gases were so hot that much of the green foliage was charred.

SURPRISES GEOLOGISTS

Dr. Diller, in commenting on the eruptions says:

"The recent eruptions of Lassen Peak have been a great surprise not only to the residents of the district, but also to most of the geologists who are more or less familiar with the decadent volcanic energy of the Cascade Range. It is generally considered the 'land of the burnt out fires,' and so it is; but although the fires may be out, there is much evidence of remaining heat in some places upon the summits of the great volcanoes, as in the case of Shasta and Rainier and in others about the base of the mountain, where basaltic eruptions are likely to follow around an andesite cone.

"Of all the great extinct volcanoes of the Cascade Range, Lassen Peak is the richest in solfataric action. Southeast of Lassen Peak there are Bumpass' Hell, Lake Tartarus, the Geyser, and the Devil's Kitchen, beside many other hot sulphurous springs, all of which are exhibits of volcanic energy, and a short distance to the northward is the Cinder Cone, a national monument which marks the scene of one of the latest volcanic eruptions in the United States.

"Most of the dust ejected falls within a radius of a mile, but some has been carried by the wind as much as 15 miles to the southward, and the sulphurous fumes are said to have been recognized at about the same distance. A quarter of a mile from the crater, to the southwest, the sand and dust layer on the snow was 3 inches thick, and being wet, looked from a distance, black and peculiar on the white snow. When dry this dust is very light and easily carried by frequent whirlwinds into the air to make the mountain look as if it were smoking. Forest rangers who were



WRECK OF FOREST SERVICE STATION ON MT. LASSEN

in the neighborhood of the summit during eruptions heard the rushing steam and the falling rocks, but report no rumbling or subterranean noises, earth shocks, electrical phenomena, or great heat beyond that of the escaping steam.

"Considerable volumes of water were ejected, probably wholly in the form of steam. The water condensed as rain, but there was not enough of it to produce any marked effect by eroding the surface, and the phenomenon is in no proper sense a geyser where water is the plug ejected by successive eruptions. In Lassen's new crater the plug is rock matter.

"The activity appears to be limited to a comparatively shallow depth at the summit of the mountain.

"Nearly all the hot springs and solfataras about Lassen Peak have been visited recently and the common opinion found true that there is no evidence of increased intensity in the solfataras since the eruptions from the summit of Lassen Peak began.

"There are excellent views of Lassen Peak at a distance of about 50 miles, from the Southern Pacific trains between Redding and Cottonwood, especially at Panorama Point, a few miles south of Anderson.

"The forest service at Mineral, W. J. Rushing, forest supervisor in charge, has an outlook station on Brokeoff Mountain, in full view of Lassen Peak, only a few miles away to the northward. Mr. Rushing's observers are on Brokeoff Mountain, a part of Lassen's oldest crater rim, continuously, and have an excellent opportunity to make a complete record of Lassen's activity, a service of great importance.

"Lassen Peak may be reached from Redding, on the Southern Pacific Ry., thence by motor to Viola P. O. and Manzanita Lake, but the motor trip is long and the mountain climb from the northwest is hard.

"A better way is from Red Bluff, on the Southern Pacific Ry., thence by motor to Mineral Postoffice, thence horseback 12 miles to the foot of the mountain, and an easy climb of about an hour and a half to the summit from the southeast.

"The best way is from Drakesbad on the southeast, only 7 miles from the mountain. Drakesbad, formerly Drake's Springs, is an attractive mountain resort in Hot Spring Valley, from which not only Lassen Peak but also Cinder Cone and other interesting volcanic phenomena may be easily visited.



MT. LASSEN

"Drakesbad is a 30-mile motor ride from Westwood, the fine hoteled terminus of the Southern Pacific branch line from Fernley, Nev., to Susanville. There is a through sleeper from San Francisco to Susanville on train No. 6.

"The Western Pacific Ry. affords an easy approach by way of Keddie and thence by motor to Westwood, or from Doyle to Susanville."

IDAHO SILVER, LEAD AND ZINC PRODUCTION INCREASES

Boise County Leads State in Gold Production—Coeur d'Alene Responsible for Silver Increase

The value of the mine output of gold, silver, copper, lead, and zinc in Idaho in 1914, according to C. N. Gerry, of the United States Geological Survey, was \$24,645,848, against \$24,149,049 in 1913 and \$21,466,521 in 1912.

There were good increases and record productions of silver, lead, and zinc, but decreases in gold and copper. The increase in total value was \$496,799, due principally to mines in the Coeur d'Alene region of Shoshone County.

GOLD DECREASES

The production of gold decreased from \$1,344,559 in 1913 to \$1,152,315 in 1914, or a decrease of \$192,244. Gold from placers was valued at \$700,454, and that from deep mines at \$451,861. Of the placer gold, \$568,989 came from dredge operations. Boise County led in gold output valued at \$601,227, and Lemhi County followed with a production of \$305,991 in gold. These are the counties in which most of the dredging is done. Gold produced from mill bullion by amalgamation and cyanide was 12,284.03 ounces; from concentrates, 3,168.48 ounces; and from crude ore smelted 6,406.28 ounces. Siliceous ores supplied 17,582.59 ounces of gold; copper ores, 1,076.56 ounces; lead ores, 2,467.11 ounces; and lead-zinc ores, 725.78 ounces.

RECORD FOR SILVER

A record production of silver increased the figures from 9,989,193 ounces, valued at \$6,033,473 in 1913, to 12,479,516 ounces, valued at \$6,901,172 in 1914. This increase of 24.93 per cent. was creditable almost entirely to the Coeur d'Alene region. Concentrates supplied 8,845,309 ounces of silver; crude ore, 3,612,369 ounces; and bullion, only 14,767 ounces. Most of the silver, or 8,697,580 ounces, came from lead ores, 3,491,469 ounces from lead-zinc ores, 239,355 ounces from copper ores, and 39,002 ounces from siliceous ores. Shoshone County produced 97.59 per cent. of the total, or 12,178,194 ounces. The Hunter district at Mullan supplied 1,057,347 ounces; the Leland district at Burke and Mace, 5,565,372 ounces; and the Yreka district at Wardner, 4,887,926 ounces.

COPPER OUTPUT DECREASES

The copper output decreased from 9,592,966 pounds, valued at \$1,486,910 in 1913, to 6,445,187 pounds, valued at \$857,210 in 1914. Of the total, Shoshone County produced 4,242,662 pounds and Custer County 2,110,909 pounds. Copper ores were the source of 4,986,206 pounds and small percentages came from lead ores and lead-zinc ores. Concentrates contained 3,242,294 pounds, and crude ore 3,202,893 pounds.

Records were again broken in the production of lead, which increased from 317,871,945 pounds, valued at \$13,986,366 in 1913, to 348,526,069 pounds, valued at \$13,592,517 in 1914, an increase of 30,654,124 pounds. Mines in Shoshone County produced 97.47 per cent. of the lead; Fremont County, 1.25 per cent.; and Lemhi, less than 1 per cent. Crude ore smelted supplied 82,816,132 pounds and concentrates 265,709,937 pounds. Most of the lead, or 261,689,295 pounds, came from lead ore, and 86,822,925 pounds came from lead-zinc ore. Hunter district was credited with 35,798,211 pounds; Leland district with 121,603,290 pounds; and Yreka district with 162,471,235 pounds.

ZINC OUTPUT SOARS

A greatly increased production of zinc ore and concentrate brought the spelter output from 23,173,953 pounds, valued at \$1,297,741 in 1913, to 42,012,435 pounds, valued at \$2,142,634 in 1914. Nearly all the zinc came from Shoshone County, 35,453,268 pounds coming from lead-zinc ore and 6,559,167 pounds from zinc ore. Concentration and flotation machines made a product supplying 34,926,439 pounds and crude ore supplied 7,085,996 pounds.

MORE MINES WORKED

There were 386 producing mines in Idaho in 1914, against 384 in 1913. Of these, 176 were deep mines and 210 were placers. Ore sold or treated in 1914 was 2,235,349 tons, against 2,451,592 tons in 1913. Of the total, 2,066,361 tons were concentrated, making 303,046 tons of concentrates. Gold and silver mills treated only 34,861 tons, and 130,512 tons were crude ore smelted. Most of the material was smelted outside the state, as but one smelter was operated at Clayton, in Custer County.

Suspend Red Wing Rate

Proposed inquiries on rates on bituminous coal from Chicago to Redwing, Minn., and certain other points, have been suspended until February 29, 1916. A previous order suspended these rates from May 1 to August 29.

Gypsum Figures Break Record

The production of gypsum in 1914 was marked by an increase in value due to a considerable advance in the price of calcined gypsum, the total value breaking all records, according to a Geological Survey bulletin.

CHEMICAL SHOW CAUSES ADDED INTEREST IN MINERALS

Raw Material from American Mines to be Used More Extensively in Future— Exhibits Were Extensive

Attention was called in a striking manner to the opportunities offered for increased exploitation of raw materials from American mines at the First National Exposition of Chemical Industries held in New York September 20-25. Expositions of this branch in other countries have been of the greatest value in developing a solidarity of interests among chemical manufacturers in bringing them more closely in touch with producers of raw materials, with novel devices and perfected methods, with designers of improved mechanical accessories, and finally with the consumers of finished products. Such occasions have been stimulating, suggestive, and inspiring, showing where national resources have been neglected, where the needs of domestic consumption have been overlooked, or only inadequately met, and, on the other hand, where difficulties and obstacles, physical, technical, or commercial, have been vanquished by the intelligent application of scientific fact and theory, or by the happy combination of pluck, daring, and skillful adaptation, according to Thomas H. Norton, of the Department of Commerce.

This first gathering of our country's technical chemists for a comprehensive presentation of their achievements in meeting the nation's demands for an enormous variety of products that fall technically into the category of chemicals unquestionably was highly educative. It shows marvelous accomplishment in certain fields; in others it reveals a lack of enterprise in utilizing effectively and fully the magnificent treasures of our mines, forests, fields, and streams.

The visitor at the exposition noted how admirably the wonderful sulphur deposits of Louisiana are exploited and utilized, the extent and perfection of our manufacture of acids, especially of contact sulphuric acid, and the completeness of our petroleum industry. At the same time he saw how we have almost totally neglected the vast stores of potash stored annually in the kelp crop of our Pacific littoral, and send \$10,000,000 abroad to purchase products of the Stassfurt mines.

He saw likewise that we waste coal-distillation by-products valued at \$100,000,000 while we remit \$10,000,000 annually to Germany for the purchase of the varied tints demanded by our textile and allied branches.

He learned that mountains of sawdust accumulate about the sawmills of the Northwest, while we import annually from Germany over \$400,000 worth of oxalic acid, which could so easily be manufactured from the waste sawdust.

GOVERNMENTAL ASSISTANCE

The national Government early recognized the importance of furthering in every possible

way the evolution of a chemical industry. This has found concrete expression in a number of bureau organizations. The chief instrumentalities in this connection are the Bureau of Mines and the United States Geological Survey, in the Department of the Interior, the Bureau of Animal Industry, the Bureau of Plant Industry, the Forest Service, the Bureau of Chemistry, and the Bureau of Soils, of the Department of Agriculture; and the Bureau of Standards, Bureau of the Census, and Bureau of Foreign and Domestic Commerce, of the Department of Commerce. Of the bureaus in the Department of Commerce, the Bureau of Standards has for its main purpose the standardization of the mechanical accessories, the processes, and the products of these industries; the Bureau of Foreign and Domestic Commerce brings the producer of raw materials into touch with the manufacturer, and the latter into relations with the consumer, through its studies of markets and trade opportunities at home and abroad; and the Bureau of the Census is the national bookkeeper of the industries.

EXHIBITS BY GOVERNMENT BUREAUS

Early in the past summer it seemed eminently desirable that the many-sided activities of our national Government in furthering the development of the various chemical industries should be comprehensively displayed by a collective exhibit of the above-mentioned bureaus in the first national exposition of this branch. A meeting was held in the office of the Chief of the Bureau of Foreign and Domestic Commerce, at which fourteen delegates from the bureaus mentioned above were present. The manager of the exposition was in attendance and outlined at length the objects and features of the undertaking.

As a result of this gathering, steps were taken by the different bureaus to participate in a collective exhibit which should clearly reveal the many ways in which departmental agencies are aiding the technical chemist, seeking raw material, perfecting methods and mechanical appliances, testing his products, and seeking markets for them in every quarter of the globe.

The Geological Survey prepared an elaborate exhibit of charts, transparencies, and mineral specimens, displaying in manifold variety the natural resources of the land available as raw material for the manufacturing chemist. This emphasizes the extent and variety of our mineral resources, as yet scarcely utilized by domestic chemical works, or sent abroad to return to us in the form of purified and valuable compounds, essential to a variety of industries.

The exhibit of the Bureau of Mines included an imposing display of the means employed to insure the safety of the miner. The general public gathered in throngs to witness the complete exposé of the fascinating process, devised by Dr. Rittman, of the Department of the Interior, for transforming almost worthless petroleum residues at will into volatile

gasoline for motor engines, or into benzol and toluol, now employed on so vast a scale for the manufacture of high explosives. Other exhibits illustrate the work of the bureau in producing the raw metal radium from American carnotite, at a cost far below that required by current methods of preparation in Austria and France, in studying the technology of petroleum, and in investigating the clays of the South.

The exhibit of the Forest Service displayed the remarkable results obtained from its laboratory at Madison, Wis., in producing a pure, brilliant, yellow dyestuff from the Osage orange, growing in such profusion throughout the valley of the Mississippi, notably in Texas and Oklahoma. This forms a valued addition, at this period of dyestuff scarcity, to the coloring materials available for tinctorial purposes. Of great interest are also the exhibits of the most effective methods for turning various American woods, besides spruce, into pulp for paper manufacture and for preparing silk and cellulose products from woods.

The Bureau of Chemistry exhibited the novel and fascinating process recently devised for concentrating and separating fruit juices by partial freezing of the liquids in which they are present; much material illustrative of paper making; the development of standards and inspection of naval store supplies; the utilization of various waste products; tanning materials; demonstration of the wearing quality of sole leather; recovery of tanning waste; denaturing and utilization of egg products in tanning operations.

The elaborate exhibit by the Bureau of Soils of everything connected with the extraction of potash salts from the kelp of the Pacific coast attracted the attention of great numbers, on account of the keen interest now felt throughout the entire country in a satisfactory solution of the problems connected with assuring a domestic supply of this most important class of salts.

The exhibit of the Bureau of the Census comprised a complete set of the publications and bulletins portraying, at quinquennial periods, the status and condition of the various chemical industries.

The exhibit of the Bureau of Standards was the most complete and extensive of any of the departmental agencies. It illustrated in detail the varied activities of the Bureau of standardizing methods and accessories in the manufacture of iron and steel, nonferrous metals, cement and concrete, lime and plaster, ceramics and glass, bituminous materials, paint and varnish, mineral oils, gas, textiles, paper, ink, rubber, sugar, refrigeration, electrochemical industries, and laboratories in general. Many types of apparatus also were shown, such as thermometers, pyrometers, volumetric apparatus, calorimeters, saccharimeters, gas and water meters, etc. Samples of various materials and illustrative methods of testing or purification formed prominent features.

The exhibit of the Bureau of Foreign and

Domestic Commerce showed the chemical trade the highly perfected methods for collecting, filling and communicating trade information. An official of the New York branch office was in constant attendance, explaining to all visitors the many facilities offered by the mechanism of the Bureau for bringing to the attention of chemical manufacturers the opportunities for extending their trade to all quarters of the world, and for securing such information from foreign lands as may be helpful in improving and expanding their respective branches. There was a complete exhibit of the many publications of the Bureau, which record the statistics of our domestic and foreign trade or present in full detail the data desired by all branches of industry and commerce on foreign markets and condition.

VALUE OF BUREAU PUBLICATIONS

The Bureau of Foreign and Domestic Commerce has devoted special attention to monographs upon chemical subjects. Among these are reports on "The Utilization of Atmospheric Nitrogen," "The Chemical Industries of Belgium, Holland, Norway and Sweden," "Cotton-seed Products," "Dyestuffs for American Textile and other Industries," "Foreign Trade in Denatured Alcohol," "Foreign Trade in Paints and Varnishes," "Foreign Salt Market and Industry," "South American Market for Soap," "Some Aspects of the Iron and Steel Industry in Europe," "The Sugar Industry," "The Pottery Industry," etc.

Much attention has been devoted by the Bureau to the acute conditions now prevailing in the dyestuff industry and to the means of mitigating its hardships, as well as of freeing our textile and other interests from the nearly complete dependence upon dyeing materials of foreign origin. In this connection there was a full display of samples of the new colors recently invented in the United States, and first brought to the attention of dyestuff consumers by the Bureau. There was an extensive collection of samples of various chemical products, illustrative of the investigations organized by the Bureau and now under way to ascertain clearly and definitely to what extent the United States is dependent upon foreign countries for its supply of chemicals, to what degree American raw material is available for the domestic manufacture of such chemicals, and whether the time is not opportune to seek aggressively foreign markets for products of our domestic chemical works. The Bureau is responding to a public sentiment that the time is ripe for the evolution of a complete, comprehensive, genuinely American chemical industry.

Arizona Altitudes Measured

Altitudes have been measured at a number of places in Arizona recently by the Geological Survey. The highest altitude in that State is San Francisco Peak, in Coconino County, which is 12,611 feet above the sea-level.

WEST'S MINERAL OUTPUT WILL BE INCREASED BY MANY MILLIONS, MANNING THINKS

Work Being Conducted or to be Begun by the United States Bureau of Mines
Together with Results from Mining Experiment Stations Expected
to Do Much to Stimulate Mining Industry

Before a representative gathering at the eighteenth annual convention of the American Mining Congress, Van H. Manning, Director of the United States Bureau of Mines, delivered the following address:

Before going into a general discussion of what the Bureau of Mines of the Department of the Interior has done, is doing, and hopes to do for the metalliferous industries, I shall call attention to the purpose of the Bureau of Mines, as conceived by the late director of the Bureau, Dr. Joseph A. Holmes, and as embodied in the organic act outlining the Bureau's duties. This purpose, which has the full sanction of the present Secretary of the Interior, is to conduct in behalf of the public welfare such fundamental inquiries and investigations as will lead to increased safety, efficiency, and economy in the mining and metallurgical industries of the United States. Such investigations must of necessity be general in scope and national in character.

STANDS FOR ALL ALIKE

The basic principle of the work of the Bureau is that the investigations it conducts and the recommendations it makes are not for the benefit of private enterprises or properties. The Bureau stands for all alike, and its investigations concern the mining industry as a whole.

It is no wonder that you men from the West, especially those of you interested in the mining and treatment of ores and metals, ask what you may expect from the Bureau and what it hopes to do for the industries you represent. For this reason you may wish to know something of the history of the Bureau and the causes that led up to its establishment.

The work of the Bureau of Mines was initiated in 1904 under the United States Geological Survey. The reorganization of this work under the Bureau of Mines became effective July 1, 1910. Under the Geological Survey, fuels and structural materials were tested, and investigations of the causes and the prevention of coal-mine explosions were begun. The creation of the Bureau was due to a general desire for the extension of the work into metal mining and other new fields.

CHIEF ATTENTION GIVEN TO COAL

During the past five years—the life of the Bureau—its chief work under the wording of appropriations made by Congress has been

centered on efforts to bring about greater safety in coal mines, by testing and approving better types of explosives, miners' lamps, and electrical and other equipment, and by recommending safer methods. The first appropriation for inquiries and investigations into the mining and treatment of ores and other mineral substances, with special reference to safety and waste, was not made until 1912. Prior to this appropriation the Bureau was able from other appropriations, although these were inadequate even for urgently needed investigations relating to coal mining, to conduct preliminary inquiries of a few metal-mining problems because of the bearing of these problems on the coal-mining investigations. However, as yet the Bureau's work has been confined largely to investigations of coal-mine accidents and the study of preventive measures that, if adopted, will save the lives of thousands of miners.

The more important work that the Bureau has done in relation to the metal-mining industry is briefly summarized here:

BENEFITS FROM METAL-MINING INVESTIGATIONS

The Bureau has studied the smelter-smoke problem with the purpose of aiding the development of methods whereby damage to vegetation from smelter fumes may be greatly lessened, if not prevented, and smelters that are now closed by litigation over such damages may be enabled to operate and to take ores from mines now idle through lack of a market.

Investigations of the effects of silicious rock dust in mine air have shown, in one important lead and zinc mining district, an excessive prevalence of tuberculosis from breathing air containing such dust, and have resulted in remedial measures being undertaken by mining companies and State officials.

A method of concentrating the carnotite ores of Utah and Colorado has been devised by which thousands of tons of material that under former methods would have been allowed to go to waste has become a source of profit to the miner.

A process has been perfected by which radium, needed for the treatment of cancer and other malignant disease by Government hospitals, can be recovered from these carnotite ores at a cost that is one-third of the price formerly asked by foreign producers.

Investigations of explosives for use in metal mines have shown the need of explosives giving off minimum amounts of noxious

fumes, and have led to the manufacture of improved types of explosives.

The Bureau has published as a basis for the increase of safety in metal mining an annual statement of accidents in metal mines in which, for the first time, accidents in all metal-mining States have been grouped by causes, so they can be directly compared.

CANDLES ARE GOING

Investigations of mine lamps have shown the advantages of acetylene and electric lamps for metal miners, and are resulting in such lights replacing candles and torches, which have caused many fires in mines.

Extension of mine rescue and safety training into metal-mining districts has resulted in hundreds of metal miners being trained in first-aid and mine-rescue methods, and has stimulated the formation of mine-rescue corps and the purchase of first aid and rescue equipment by mining companies.

Studies of tungsten and molybdenum ores by the Bureau are developing improved processes of concentration, which, it is believed, will make possible the profitable exploitation of many small mines now idle.

Studies of methods of concentrating lead and zinc ores have shown mine owners where losses occur, and how a greater percentage of the metal in the ores can be reclaimed.

STUDIES IN IRON

Titaniferous iron ores have been investigated in order to determine the practicability of separating the iron and titanium minerals by electric concentrators, and also the possibility of smelting such ores directly in blast furnaces, the purpose of these investigations being to help make available as sources of iron large deposits of titaniferous ores now unworked.

An investigation of methods of treating low-grade complex ores such as are found in many districts throughout the Rocky Mountain States is showing what methods may be commercially used for recovering metals in these ores and thereby make available millions of tons of ore now unworked.

A study of the causes of mine fires has shown how many metal mine fires have started and the Bureau has pointed out the precautions to be taken against such fires and the best methods of fighting them.

Studies of ventilation in metal mines, though of a preliminary character, have shown the need of better methods of ventilation in some mines.

An investigation of placer-mining methods, now in progress, has already shown how some of the losses of precious metals at gold dredges can be obviated or prevented.

The Bureau has given much attention to the development of laws to increase safety in mining, and has just published comprehensive rules for metal mines, which are intended as a guide for State officials and officials of mining companies in framing better laws and regulations.

WASTE IS LESSENER

Through various investigations new processes and methods are being devised for saving and utilizing with profit metals and mineral substances that under past methods have been wasted.

The Bureau's fuel-testing investigations are showing how greater economies can be effected in generating power for mines and mills, and how low-grade fuels can be used advantageously in regions where high-grade fuels are costly.

In presenting this summary of accomplishments, I wish you to understand that I do not claim that they represent the work of the Bureau alone. The active cooperation of other Government bureaus, of State inspection departments and of many individuals is gratefully acknowledged.

SAFETY WORK

I do not feel that I am claiming too great credit for Dr. Holmes when I say that he chiefly was responsible for the nation-wide progress of the "safety-first" movement, which has now reached every industry in the country. His belief that safety implies efficiency and that true efficiency insures safety is shown by the motto that he adopted for the Bureau of Mines—"Safety and Efficiency" in the mining industries. His keen realization that the Bureau by itself could do little to insure improvement is shown by the following extract from his last annual report:

"In conducting its campaign for the increase of safety and efficiency in the mining industries there has been adopted the following general plan of cooperation between the National Government and other larger agencies. (1) That the National Government conduct the necessary general inquiries and investigations in relation to mining industries, and disseminate in such manner as may prove most effective the information obtained and the conclusions reached; (2) that each State enact needed legislation and make ample provision for the proper inspection of mining operations within its borders; (3) that the mine owners introduce improvements with a view to increasing safety and reducing waste of resources as rapidly as the practicability of such improvements is demonstrated; and (4) that the miners and mine managers cooperate both in making and in enforcing safety rules and regulations as rapidly as these are shown to be practicable. The States, the miners and mine owners, and other agencies, such as the mining and engineering societies, are now showing a commendable willingness to cooperate with the National Government in this work."

I sincerely hope that the spirit of cooperation which Dr. Holmes aroused will continue to spread and grow stronger and that the Bureau may work in full sympathy with the desires of the mining industries of the country.

MINING EXPERIMENT STATIONS

The need of mining experiment stations through which the Federal Government could extend to mining some measure of the liberal aid it has long given that other basic industry, agriculture, by the establishment of fifty-two agricultural experiment stations and the expenditure of hundreds of millions of dollars, was strongly presented to Congress by the Secretary of the Interior, and as a result of the sympathetic interest of Secretary Lane in the efforts made by Dr. Holmes for the betterment of mining an act providing for the establishment and maintenance of ten mining-experiment stations and seven mine-safety stations in addition to those already established was passed at the last session of Congress. The enactment of this legislation, the last in which he was actively interested, stands pre-eminently as a monument to the creative force and energy of Dr. Holmes.

The conduct of experimental work for the whole metal-mining industry from one central station in one of the metal-mining States was seen to be impracticable because of the vast area over which the ores are scattered, the varied nature of the ores and the conditions under which they must be developed. Therefore, when the plan of establishing several stations was conceived it was decided that the greater number of these stations should be located in the Western States. It is expected that each State in which a station is located will cooperate in the study of mining problems by supplementing the appropriations to be made by Congress, the States' efforts being directed to such investigations as are distinctly local in character, while the Federal Government investigates those problems that are more general and national in character and importance. Under the terms of the act three of those mining-experiment stations are to be established each year under the appropriation made therefor.

PRODUCTION OF RADIUM

Some of the more notable achievements of the Bureau of Mines I have already mentioned. One of these is the production of radium on a commercial scale from Colorado ores by a process that is much cheaper than other processes and is cheaper even than was predicted by the Bureau. By this process 1 gram of radium can be produced by the Bureau at a cost of \$36,500, this figure including cost of ore, insurance, repairs, amortization allowance for plant and equipment and all other incidental expenses. I hope that you will not think that I have any desire to boast of what the Bureau has done, but when you remember that radium has been selling for \$120,000 to \$160,000 per gram, this accomplishment of the Bureau will, I trust, seem worth while.

The first important result of the Bureau's radium investigations was to increase the price the miner received from the foreign

buyers of the ore. When the radium investigations began in 1912 carnotite ore carrying 2 per cent uranium oxide was selling at approximately \$75 per ton f.o.b. New York, a figure that certainly did not pay the cost of mining and shipment. During 1913 and the early part of 1914, through information the Bureau published in regard to the export of American ores and the value of these ores, the price increased and had fully doubled by the time the European war began.

The ores from which this rare metal is extracted are few and the deposits are not inexhaustible. For this reason it is highly desirable that the Government take action that will prevent so much of this ore as now remains in its possession from being wasted or monopolized. The only fields of carnotite ore known today are in Colorado and Utah, and those fields cannot supply ore for many years of such mining as prevailed at the beginning of the European war. Meanwhile, the demand for radium is bound to increase rapidly as the value of the radium emanation in the treatment of disease is demonstrated. By its use some of our eminent surgeons have obtained remarkable cures of cancer.

Having thus briefly called attention to some of the things the Bureau has done, I will ask you to consider a few of the things the Bureau can do and is endeavoring to do for the advancement of metal mining in the Western States.

METAL-MINING PROBLEMS

Improvements in mining and transportation have brought great changes to the metal-mining industry. Low-grade ores that were formerly left in the ground as worthless are now being mined, and waste dumps and piles of tailings are being treated at a profit. The great problems that confront the mining industry of the West today are the development of cheaper methods of mining and milling low-grade ores, and the devising of metallurgical processes that will extract the relatively small metal content at a profit. To reduce the cost of handling and treating ores, the application of the best existing methods and the development of new methods are required. Only the larger companies can afford to carry on necessary investigations for themselves. Experiment is beyond the reach of a small company with limited capital. Furthermore, there is need for a national agency for gathering and distributing information of value to everyone engaged in the industry, and for making such recommendations as will best assure adoption of safer and more efficient methods. It is in work of this kind, work that deals with general and fundamental problems, whose solution is necessary to the upbuilding of an industry that Government activity can prove itself of most value.

The United States Geological Survey has done much to increase our knowledge of the character, geologic relations and areal extent of the mineral resources of the West, and several States have ably assisted its work.

The work of the Federal Bureau of Mines begins where the work of the Survey ends. Investigations to determine how mining methods can be made safer and more efficient, how milling and metallurgical methods can be improved so as to assure a larger extraction of metal, reduce waste, and avoid damage to other interests, and how ores or mineral substances now unused can be made a source of wealth—these are all within the scope of its duties as defined by Congress. Much of the work that the Bureau is doing in the West is in only the initial stage. At present activities are largely centered at three points.

INVESTIGATION AT SAN FRANCISCO

At San Francisco the smelter-fume investigation is in progress. Here the chemical changes involved in the roasting and smelting of sulphide ores, the formation of compounds that make smelter smoke injurious to vegetation, and the methods by which this damage can be lessened or prevented have been and are being carefully studied in the laboratory and investigated at smelting plants in co-operation with other agencies attacking the same problems.

The work of the Selby Smelter Commission, of which Dr. Holmes was chairman, deserves notice. This commission, composed of disinterested experts, investigated the question of damage from the Selby smelter, a question that had given rise to protracted and costly litigation, and embodied its findings in an exhaustive report that is being published by the Bureau of Mines. The methods used by the commission have been adopted in other investigations of smoke damage.

The importance of the smelter investigations lies not only in the possibility of their showing how substances now wasted in smelter smoke and fume can be recovered and utilized with profit, but also in the probability of their demonstrating how smelters that have been closed by litigation over smoke damage may be operated without doing injury, and thus become buyers of ore from local mines that are now unworked because of the lack of markets.

Recently at San Francisco the Bureau has begun a preliminary investigation of the hydrometallurgy of gold and silver ores, in the effort to develop uniform tests and to make improvements in various details of the cyanide process, with a view to increasing its efficiency. At present the work is confined to the cyanidation of silver ores from Nevada, and is receiving active cooperation from the Nevada Mine Owners' Association.

Another investigation being conducted through the San Francisco office relates to placer mining, including the operation of gold dredges and the working of hydraulic mines. This investigation consists largely of field studies though it is hoped that various special problems will later be studied by laboratory methods.

INVESTIGATIONS AT DENVER

To the importance of the radium investigations being carried on at Denver I have already called your notice. Other work being done at Denver includes studies of the minor metals, such as tungsten (used in the filaments of electric lights and in special steels) and molybdenum (needed in the manufacture of alloy steels) and others, many deposits of which are scattered through the mining districts of the West, but are unworked because of the difficulty of mining and concentrating the ores profitably with existing methods. Already these investigations have shown that by improved concentrating methods devised by the Bureau's engineers, deposits of molybdenum ore now lying idle can be worked profitably.

AT SALT LAKE CITY

At its Salt Lake City station the Bureau is conducting, in cooperation with the University of Utah, investigations to ascertain the extent of the low-grade and complex ores carrying gold and silver with copper and lead or zinc that are now unworked but will become of value with the development of a practical process for recovering the metals. In these investigations the extent of the low-grade and complex ores in the State of Utah has been determined, and it is planned to make similar examinations in Idaho and other adjoining States. Meanwhile, various methods of concentrating and treating these ores are being tested in the laboratory and are being studied at mills, in the attempt to devise more efficient and economical methods than those now in use. Vast quantities of these low-grade ores await treatment in the older mining districts of Utah and adjacent States, and the development of efficient methods of treatment will increase the value of the mineral output of these States by millions of dollars.

In addition to the work for the advancement of metal mining that the Bureau is doing through these stations, such of its mine-rescue cars as could be spared from urgently needed work in the coal fields of the country have made a beginning in training metal miners in first aid and rescue methods. The mining engineers in charge of these cars have been investigating those phases of lighting, ventilation, and the use of explosives that are peculiar to metal mines, and have prepared reports embodying recommendations for the prevention of accidents and the use of safer devices and methods.

It is hoped that at the next session of Congress provision will be made for the purchase and equipment of the three new mine-rescue cars authorized, thereby enabling a much needed extension of rescue—and first aid training in the metal-mining States.

WHAT BUREAU MAY DO

The metal mining investigations and inquiries that might be profitably followed by

the Bureau of Mines are so many and various that I will not attempt to mention them all. As a suggestion of what the Bureau may be able to aid in accomplishing, I offer the following summary of some mining and metallurgical problems, and a brief statement showing how large are the imports of some metals and minerals that are found in this country but are not produced here or are produced only in small quantities.

In the mining and metallurgy of the precious metals there remains the possibility of recovering a larger amount of platinum and other metals of the platinum group from gold placers, and also the possibility of devising processes for extracting gold and silver profitably from low-grade complex ores. Many gold and silver ores contain a considerable percentage of zinc, but until recently, little or no attempt was made to recover this metal. Losses in the mining, milling, and metallurgy of zinc ore are startling. At many districts in the West, owing to high freight rates and high smelter charges, much low-grade zincy ore is left in the mine. In concentrating zinc ores the total metal losses may amount to 30 to 35 per cent. In the treatment of such complex zinc-bearing ores by present methods some of the contained silver, lead or copper is often wasted. On the other hand, if the ore is treated for its copper content, for instance, not only is the zinc wasted but a penalty is charged, depending on the amount of zinc present, that is often as high as \$5 or \$6 a ton. The total loss in the metallurgy of zinc ores, from the ore in the ground to the commercial smelter, is rarely less than 40 per cent.

AS REGARDS COPPER.

As regards copper ores, large deposits still remain unworked, and the percentage of metal recovered in many mines is lower than it should be. The total waste from ore to refined copper in many instances is 30 to 40 per cent of the metal in the ore.

In 1913 about 87 per cent of the copper produced in this country came from the Western States. As this represented a recovery of about 70 per cent of the copper in the ore, the annual loss of copper that year in those States alone was fully \$70,000,000 or \$200,000 a day.

At present the treatment of many copper ores is on the verge of a revolution, as shown by enormous plants just erected in Montana and Chile, through the use of wet methods—leaching and precipitation—in place of dry concentration by smelting.

As regards the total production of other metals, in 1913 the production of tin, antimony, platinum, chromic iron ore, and manganese ore in the United States amounted to only \$130,000, whereas the value of these same minerals imported into the United States in that year was nearly \$56,000,000. The most important item in this list was tin, the output of which in the United States was valued at less than \$37,000, whereas the imports were valued at nearly \$47,000,000. There are un-

developed tin deposits in California, Idaho, Washington, Wyoming, and Alaska, and some partly developed deposits in Texas and South Dakota. At present Alaska produces practically all the tin that is mined in the United States.

The United States produces no antimony but imports about \$1,000,000 worth. Deposits of antimony ore are known in eight or ten of the Western States.

Less than \$50,000 worth of platinum is produced in the United States each year, whereas imports are 100 times as large. Platinum is found in nearly every Western State, and is recoverable from many gold placers and beds of black sand.

The production of manganese ore in the United States is valued at about \$40,000, whereas the imports are fifty times as large. Deposits of manganiferous ores are found in at least eight of the Western States.

Large deposits of high-grade iron ores are found in the Pacific coast States, where as yet there is practically no production of pig iron, owing to the scarcity of good coking coal, and iron and steel are imported or procured through the payment of high freight charges from furnaces farther east.

It is my belief that through investigations now under way, and through investigations to be carried on at the new mining experiment stations authorized by Congress, efficiency in mining will be stimulated, new processes of treating ores will be developed, new uses for substances now wasted will be found, and the metal production of the Western States will be increased in value by millions of dollars annually. Also, conditions affecting the safety and health of miners and of workers in mills and smelting plants will be so greatly improved that the present high death rate from accidents will be reduced until American methods in mining and metallurgy will be regarded as no less notable for safety and efficiency than they are now for boldness, large outputs and low costs.

But the Bureau cannot accomplish these ends by itself. It must have the cooperation of State officials, of mining and metallurgical companies, and of the workers in mines, mills and smelters. Acting as an investigator, a guide, having no power to enforce its recommendations, it seeks your aid and will welcome suggestions or advice in regard to the problems it should investigate and the methods it should follow. The Bureau has no desire to be dictatorial or arbitrary in its attitude—it endeavors to accomplish its purpose with the least disturbance of existing conditions. As director of the Bureau I shall steadfastly endeavor to carry forward its work for the betterment of the mineral industries along the lines laid down by Dr. Holmes and I shall constantly strive to make the Bureau the great agency for the increase of safety and efficiency that Dr. Holmes wished it to be.

But the Bureau is only one among those in the Interior Department that are working for the public good, and, in conclusion, it gives

me great pleasure to assure you that in my efforts as director I shall have the continued sympathy and encouragement of that keen-sighted and broad-minded citizen of California who, as Secretary of the Interior, is doing so much to call attention to the natural resources of the West and the nation's interest in their efficient utilization.

TWO-THIRDS OF WITHDRAWN COAL LANDS UNCLASSIFIED

Two-thirds of the public coal lands in the United States remain to be classified.

The total land classified to date amounts to 19,243,742 acres. This includes all lands classified since the work was begun by the Survey.

If these lands had been sold at the lowest price possible under the law, as was done in practically every case formerly, the lands would have netted to the Government \$319,000,000; their sale under present procedure will bring \$787,000,000. As is evident, this leaves a difference of \$468,000,000 between the revenue which may accrue to the Federal Government under the present system and what would have accrued under the former system.

The average difference in value of coal lands is approximately \$25 per acre.

It probably will be twenty years before all the coal lands withdrawn can be classified and valued.

LANE TO URGE LEASING AND WATER-POWER BILLS

Secretary of the Interior Lane in his annual report, now in preparation, will again urge Congress to pass the general leasing and water-power bills which went through the House last session but failed in the Senate.

These bills provide for the leasing by the Government of coal, oil and phosphate lands in such manner as will permit the development of mineral properties on Government lands and yet retain for the nation title in such lands. Another measure to be urged by Secretary Lane is the water-power bill designed to permit the leasing of water-power rights on navigable streams.

D. W. BRUNTON THINKS MINING CONGRESS JOURNAL GREAT SUCCESS

In commenting upon the JOURNAL, D. W. Brunton, a director of the American Mining Congress, says in a recent communication: "You are certainly making a great success of the MINING CONGRESS JOURNAL. It gives you a great audience each month."

MANNING TO BE GUEST OF HONOR AT BANQUET HERE

A banquet at which Van H. Manning, the new director of the Bureau of Mines, is to be the guest of honor, is being arranged by the

members of the staff of the Bureau of Mines and Geological Survey.

Plans have not been completed, but it is the intention to give this affair late in October.

CARL SCHOLZ MADE MEMBER OF AMERICAN INSTITUTE COMMITTEE

Carl Scholz, president of the American Mining Congress, has been designated a member of the committee advisory to the Bureau of Mines on mine explosions of the American Institute of Mining Engineers. The appointment was made by William L. Saunders, president of the American Institute of Mining Engineers.

OHIO COUNTY, KY., OIL FIELD TO BE SUBJECT OF REPORT

A preliminary report on the Ohio County, Ky., oil fields is in process of preparation. While this field is small and is removed from other oil districts, there are many interesting features in its development.

E. W. Shaw, of the Geological Survey, recently spent some time studying formations in this field which will be made the basis of the report.

IRON ORE SHIPMENTS INCREASE AS GENERAL BUSINESS PICKS UP

Information reaching Washington attributes the increase in shipments of iron ore from the Lakes district to the general revival of business and not to conditions brought about by the war. The heavy increases being shown over last year are in part due to the abnormally poor business in 1914.

IMPORTANT FIELD WORK IN BIG HORN BASIN FINISHED

Important field work just has been completed by Max W. Ball, of the Geological Survey, on the eastern edge of the Big Horn Basin oil region in Wyoming.

Mr. Ball is chairman of the oil classification section of the Land Classification Board. He has been working on the Big Horn Basin for the past two months.

GULF STORM DOES NO DAMAGE TO TEXAS SULPHUR MINES

Reports from Freeport, Tex., state that no harm was done to the sulphur mines at that point by the Gulf storm which did such damage at Galveston.

To Issue Metallurgical Report

A statistical report on metallurgical work will be issued early this month by the Bureau of Mines.

REMARKABLE DEVELOPMENT OF SULPHUR IN PROGRESS ON TEXAS COAST

**Freeport Company Is Shipping an Important Part of Production from its Mines at
Mouth of Brazos River—Splendid Mechanical
Equipment Makes Task Easier**

Much attention is being attracted by the remarkable development of a sulphur deposit near Freeport, Tex.

This new sulphur field is beginning to ship an important production of sulphur and is destined to make itself felt in the sulphur trade of the world, according to information reaching Washington.

The dominance of the world's sulphur market by the Union Sulphur Co. of Louisiana is threatened as a result of this development.

The Freeport company enjoys an advantage of possessing mines located on the seaboard. Incidentally this is unique in mining experiences.

W. C. Phalen, the geologist assigned to sulphur work by the U. S. Geological Survey, has written interestingly on Texas sulphur. In a recent report he says, in part:

"Since the publication of notes on the sulphur industry in Texas in 1913 the development of the sulphur field at Bryan Heights, near Freeport, at the mouth of Brazos River, Brazoria County, Texas, has been very active, and the operations of the Freeport Sulphur Co. have been materially perfected and extended.

"The sulphur occurs in pockets and cavities and as streaks impregnating gypsum or a formation in which gypsum predominates. Cores from the deep drillings show varying percentages of sulphur. The sulphur is produced directly from the bed containing it, which is approximately 1,000 feet below the

surface. The treatment consists simply in melting the sulphur in place, thus rendering it possible to raise it to the surface by means of an air lift. Superheated water at a temperature of 336° F. and under high pressure is forced into the sulphur-bearing formation. The water penetrates the deposit and melts the sulphur (whose melting point is 239° F.), which then flows to a pipe whence it issues at the surface and flows into bins. These bins are constructed of boards, which are raised as the mass increases, the final height of the bin being from 30 to 35 feet. The sulphur promptly congeals on exposure. As it issues from the pipe the molten sulphur has a peculiar and characteristic appearance, but, as the temperature decreases, it passes through variations of color until after a few hours it assumes the true sulphur yellow.

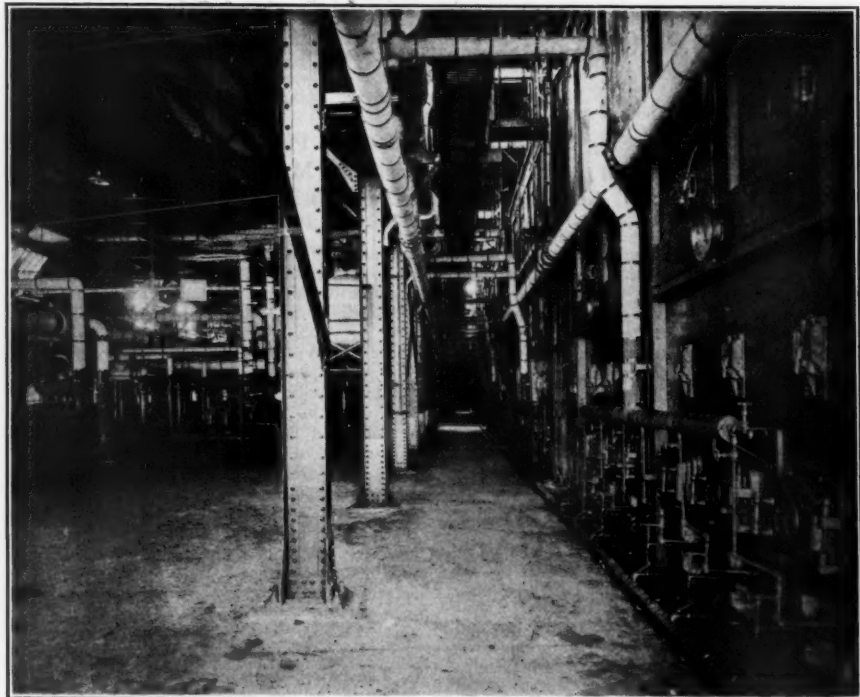
NEW PLANT

"The new plant is fireproof; it has concrete floors, water conduits, and a steel superstructure. As the entire energy of the plants is devoted to making steam for the purpose of heating water, the boiler capacity is necessarily large.

"The steam produced in the boilers is used chiefly in four mine water heaters of special design and construction. Each of these heaters is capable of heating 1,000 gallons of water a minute from 60° F. to 336° F. under a pressure of 100 pounds.



LOADING FROM CARS FOR SHIPMENT BY WATER



POWER PLANT

Picture shows boiler and pump sections only.

"Among other important additions to the plant made since the writing of the report for 1913 are the following:

"1. A new fuel-oil pumping station at the oil docks on Brazos River, embracing three pumps of large capacity, three boilers, and the connections to two fuel-oil storage tanks of 55,000 barrels capacity each, both of which have been equipped with inclosed tubular heaters for raising the temperature of the oil when necessary. The oil consumption is now nearly 2,000 barrels daily. At present the oil used is light Mexican crude from 17° to 21° (Baumé) specific gravity, but a delivery of heavy Mexican crude oil has recently been made by the Freeport-Mexican Fuel Oil Co. for the purpose of test, the gravity of the oil being about 12° (Baumé).

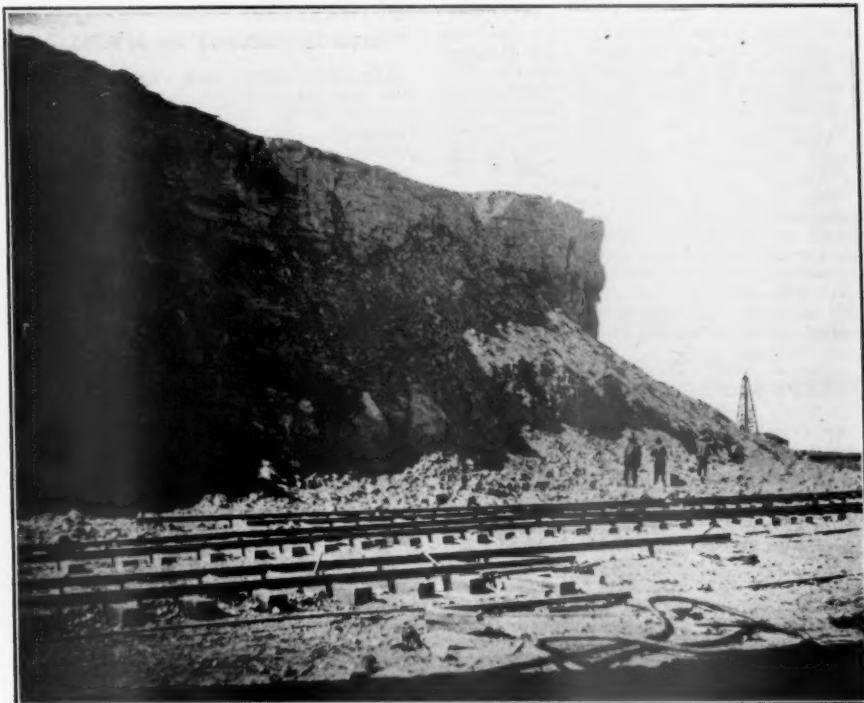
"2. An 8-inch pipe line approximately 4½ miles long leading from the oil pump station to the mines, in addition to the 4-inch line previously installed.

"3. Three additional fuel-oil storage tanks at the mines.

"4. Construction of a canal leading from Brazos River to the mines, a distance of about 3½ miles. This canal has been dredged to a minimum depth of 9 feet with a top width of

30 feet. At the terminus of the canal electrically driven centrifugal pumps take water from the canal and discharge it into a storage reservoir of 30,000,000 gallons capacity, from which ample flumes conduct the water to the pumps in the plants. The large motor-driven pumps discharge water into the reservoir at the rate of 9,000,000 gallons a day. As the daily consumption is about one-third that quantity, the operation of the pumps need not exceed ten hours a day; thus provision is made for future increased demand. This canal practically brings Brazos River to the plant and supplies all the mine water that will be required. As the river water is not always desirable, however, for use in boilers, wells have been sunk in the coastal plain surrounding Bryan Heights to reinforce the supply of boiler water.

"5. For the purpose of treating water for both boiler use and mine use, a lime treating plant has been erected and put into operation. Two large steel tanks are provided, each of sufficient capacity to contain a day's supply of reagents in solution—the quality and character being determined by daily tests of the water. These tanks are used alternately, their contents passing into a dilution tank where



BIN OF SULPHUR

Each bin is 80 by 140 by 50 feet and has a capacity of 25,000 tons.

water is added to make it easily possible to pipe the solution to the entry points of the water. All tanks are equipped with agitators, which, as well as the pumps for delivery of this solution, are motor driven. In connection with this treating plant are warehouses for storage of lime, etc. If necessary to treat river water for boiler use, soda ash is used.

"An interesting experiment is now in process in the hope of effecting a large economy in the heating of mine water. It has been proved that the normal temperature of the ground water in the geologic formation is 105° F. at all seasons of the year. As the water is now delivered to the plant for heating, its temperature varies with the season from 40° to 90° F. To raise this water to a temperature of 336° F. from 40° F. obviously consumes much more fuel than to raise it from 105° F. The ground water, however, contains scale-forming substances, and special equipment has been designed to prevent the precipitation of this scale within the heaters or piping.

"6. The area covered by producing wells was somewhat increased during the year, but with the present plan of placing wells at

corners of 100 feet squares only a small portion of the area known to be underlain by sulphur is supplying present requirements. The radius of heat influence undoubtedly varies greatly, according to variations in the character of the geologic formation, and the melt of one well is often communicated to its neighbor. Several wells are kept ready for steaming, so that whenever a well is exhausted interruption to production will be as short as possible. As wells fail contiguous wells are brought in in order to get the full benefit of communicated heat. At present two wells are steamed at once, with the expectation of soon steaming three at the same time.

AREA UNDERLAIN BY SULPHUR

"An area embracing many acres, chiefly under the mound known as Bryan Heights, has been demonstrated to contain sulphur, and arrangements are now complete to prospect this large area thoroughly, in order to locate the richest spots. The present output is most satisfactory, but there may be territory of greater richness than that now under development. This can only be determined by systematic exploration.

"The railroad serving the sulphur mines, with switch tracks to various points, has been completed. It is an extension of the Houston & Brazos Valley Ry., operated by the Missouri, Kansas & Texas Ry. At present a railroad ferry carries trains across Brazos River, but a combination railroad and wagon bridge is under construction and will soon be completed, thus greatly improving railroad service to Freeport and the sulphur mines."

The company's power plant has rated horsepower of 7,500 capable of being subjected to 100 per cent overload. One thousand seven hundred and fifty barrels of crude oil are consumed daily in firing the boilers. Over 3,000,000 gallons of water pass through this plant daily to be converted into superheated steam for heating the sulphur wells.

EXTENSIVE PHOSPHATE REPORT IS BEING MADE BY SURVEY

W. C. Phalen, of the United States Geological Survey, is working upon an extensive phosphate report. It probably will not be ready for distribution within six months.

Useful Mineral Data Being Revised

The Geological Survey data on useful minerals of the United States are being generally revised preparatory to the publication of the latest information in regard to them.

SOUTHWESTERN COAL OPERATORS

HONOR MEMORY OF J. F. ELLIOTT

The Southwestern Coal Operators' Association just has published its testimonial to the memory of the late James F. Elliott, of Haileyville, Okla., whose death occurred at Albuquerque, N. Mex., July 9, 1915. Mr. Elliott was vice-president for the Southwestern Association for Oklahoma. He was an active member of The American Mining Congress, and was chairman of its committee on State legislation for Oklahoma.

The testimonial was ordered spread upon the records of the association, published in the Bulletin, engrossed and signed by the past presidents, vice-presidents, officers and directors, in full and forwarded to the family. Those signing were: B. F. Bush, president, 1903-5; C. S. Keith, president, 1911-14; I. M. Fleming, president, 1914-16; R. T. Price, director; John Mayer, director; Dorset Carter, director; W. J. Jenkins, vice-president at large; P. R. Allen, acting vice-president for Oklahoma; C. F. Spencer, vice-president for Kansas; Ira Clemens, director; M. M. McWilliams, director; Harry N. Taylor, director; W. L. A. Johnson, general commissioner; J. H. Bovard, vice-president for Missouri; C. C. Woodson, vice-president for Arkansas; J. H. Hibben, secretary; F. W. Lukins, director; Jos. Fletcher, director, and B. T. Wiley, director.



Courtesy of Freeport Sulphur Mining Co.

**MACHINE LOADING OF SULPHUR FROM BIN IN WHICH IT SOLIDIFIED INTO
FREIGHT CAR**

ENGLISH AUTHORITY PRAISES U. S. EXPERIMENTAL WORK

Investigations of Coal Dust Explosions Much More Thorough in America, It Is Said

Costly Experiments in Britain Fall Far Short of Results Being Obtained Here

Results being obtained by the Bureau of Mines in its coal dust investigations, are commended highly by the *London Iron and Coal Trade Review*. This paper comments as follows:

The account, given by Mr. George Rice of the American coal dust investigations, in his paper read before the Institution of Mining Engineers, of which an abstract appeared in our last issue, is of unusual importance. It recounts experimental results which, for the first time, we believe, have been obtained under conditions which duplicate those of the actual commercial mine. Without disparaging the excellent work done, first at Altofts, and then at Eskmeals, in experimental galleries, it is manifest that the long, straight, smooth passage of the experimental gallery furnishes very different conditions from those afforded by the rugged perimeters and constantly varying cross-sections observed in any considerable length of normal mine road.

DEFECT POINTED OUT

It is remarkable that this defect in our own costly experimental stations has not been more clearly perceived and more loudly condemned by men who claim to be at once practical and scientific. It is remarkable, because it has long been recognized that the violence of a so-called dust explosion increases with the resistance it finds in its path, owing to the increase of pressure thus generated. It is also common knowledge that the resistive force of friction in a rough mine road is many times greater than that found in a smooth, clear shaft. Obviously, therefore, the resistance of the smooth experimental gallery is vastly less than that of the normal mine road and less than that of the experimental mine employed in the American investigations.

It is not surprising, therefore, to now discover that the "1 to 1" mixture of stone dust and coal dust found sufficient for safety at Eskmeals is, according to Mr. Rice, usually found inadequate for the same purpose in an actual mine. It is not necessary to ask whether the dust and the gas at Pittsburgh are more sensitive than ours; it is sufficient to recognize that the American conditions were more severe, and more nearly like those which obtain in the normal mine itself.

The object of our experimental stations is not, as the Home Office staff appear to

imagine, and as Dr. Wheeler actually stated at the Institution meeting, to prosecute the "arduous investigations of the phenomena of pure coal dust explosions," if, by that expression Dr. Wheeler means, as seems evident from the context, explosions free from complicated conditions. Those comparatively simple phenomena can be predicted from theory alone. No one questions the standard theories of chemistry, and the Eskmeals reports have so far told us little about "pure coal dust explosions" which might not have been taken for granted at the very outset. The real object of these costly installations—if the authorities can be brought to understand it—is not so much concerned with the chemistry of pure coal dust explosions under simple conditions. It is principally concerned with the physical conditions which surround the complicated case of the mine explosion. Those conditions can never be found in a smooth steel tube. They may be more or less approximated to by erecting a few posts of placing an annular flange within the tube, but they cannot be duplicated by any such crude methods. The rugged perimeters and jagged surfaces must be reproduced as they exist in the average roadways and ramifications of the normal mine. The recognition of that fact by the American Bureau of Mines accounts for the bewildering contradictions which Mr. Rice's account throws at Eskmeals, where the fact was overlooked. And, in our judgment, the recognition by the American Bureau of that vital fact endows their published results with great authority. Otherwise, there is little essential difference between the results recorded from America on the one side and from Europe on the other.

SHOCK WAVES

The "tentative point of view" held by the American Bureau of Mines as to the nature of the shock wave following the discharge of the cannon may, however, assist the reader to more clearly understand the philosophy of the so-called retonation waves, which, it appears, is still a mystery to some enquirers, although the "kick" of a rifle is explained by the same principle. The retonation wave, in our view, is simply the resultant of two opposite forces, one, that of the shock wave due to the firing of the cannon, and the other due to the back pressure of the exploding material, which, like any other explosive, exerts equal force in all directions, including that pointing back to the seat of origin. As Mr. Rice himself says, though he fails to make the application, "If the pressure of an explosion does not materially rise in its course, retonation waves are not detected." Of course not; retonation cannot occur until the back pressure of the advancing explosion exceeds the opposite pressure of the original shock wave initiated by the firing of the cannon.

GREAT CARE EXERCISED THAT GOVERNMENT PUBLICATIONS BE WELL EDITED

**Geological Survey Editor Is Man of Long Experience and Notable Ability—Fifty Thousand Pages of Manuscript Were Corrected Last Year—
“Technese” Is Translated into English.**

Few readers of a well-written Government report realize how much of its order and clearness may be due to the work of the Department or Bureau editors. Editorial work is especially valuable to the reader of Government scientific reports, such as those of the Geological Survey, where a small group of editorial readers prepare for printing a great number of manuscripts covering a wide range of subjects. Many of these reports are purely technical and are of service only to the technical man, but a large and increasing proportion of them discuss subjects that are of general interest or of special economic interest—such as coal beds in the West or gold placers in Alaska—and the Survey maintains the ideal that such reports should be so written that they can be understood by any man of fairly good education or intelligence. Many of the writers of these reports, however, find it hard to attain this ideal, and the Survey, before sending a manuscript to the printer, “tries it on a dog,” an editor, who becomes its first untechnical reader. In reading the manuscripts the editor not only prepares it for printing—that is, corrects its paragraphing, punctuation, capitalization, and other details of printing—but, where necessary, cuts out repetitions and superfluous words and endeavors to substitute clear, simple English for “technese.”

COUNSELOR NOT MONARCH

If the editor finds, for example, that a certain geologic formation is described as made up of “hard beds of indurated strata,” he may suggestively cut out with pencil three of the five words that make the reading as well as the rocks unnecessarily hard. If he finds an author gravely writing that “conclusions are functions of observational data and are susceptible of only partial evaluation, and as the range of possible interpretation is inversely proportional to the data available the relevancy of conclusions may be called in question,” he is likely to “call in question” the value of such obfuscation and to suggest to the author that matter of this kind, commonly called “dope,” be cut out entirely. The editorial reader, however, is by no means the “blue pencil man” of the daily newspaper, who is an absolute monarch in his work. On the contrary, he is merely a counselor, and he is required to “make good” to the author, a requirement that affords at once a test of the value of the editor’s work and of the temper and patience of the author.

MUST HAVE TECHNICAL KNOWLEDGE

To maintain amicable relations with the authors and at the same time to render the readers of the printed reports, and therefore the Survey, real service by simplifying as far as possible reports that are likely to be read by nontechnical men, the editors must have diplomacy, patience and tact, a thorough knowledge of English, and considerable knowledge of science—of geology in its many branches, including petrography, chemistry (or geochemistry), mining technology and statistics, and paleontology, as well as of hydraulic engineering.

The editor also stands between the author and the printer somewhat as an interpreter, in making the man of science familiar with the rules and requirements of the printer’s art and in helping the printer to understand and express the scientific facts and theories, so that the printed book may do no violence to the ideas or ideals of either the scientific man or the printer.

The publications of the Geological Survey for the fiscal year 1914-15 numbered 210 books and comprised 23,754 printed pages. This matter reached the editors in the form of manuscripts amounting to about 50,000 typewritten pages, and the editorial work consisted not only of preparing these manuscripts for printing, but of reading all the proof sheets and of making an index for each report.

The editorial force of the Survey consists of seven persons. The editor-in-chief, G. M. Wood, has been employed in the Survey’s editorial work for about thirty years, but insists that he still has a great deal to learn about editing manuscripts of scientific papers. Mr. Wood has prepared a pamphlet of sixty-three pages, entitled “Suggestions to Authors,” which includes hints derived from his long experience and which has been adopted as a reference book in several technical schools and colleges. Mr. Wood’s lieutenant, Bernard H. Lane, who has been employed by the Survey on its editorial work for more than ten years, combines a thorough familiarity with the printer’s art with a knowledge of the Survey’s special technicalities.

The Geological Survey is placing greater emphasis on the demand it makes of its authors for plain English, and in furtherance of this demand the editors find abundant work.

PRESIDENT SHOLZ LAUDS GOVERNMENT'S EFFORTS TO SOLVE INDUSTRIAL PROBLEMS

Tells Those Assembled at American Mining Congress that Federal Trade Commission is Doing Commendable Work—Wants Bureau of Mines and Geological Survey to Have More Money

Carl Sholz, President of the American Mining Congress, made various important recommendations and suggestions in his address before the convention held last month in San Francisco. His remarks in full were as follows:

An appreciation of the fitness of things determined the American Mining Congress to hold its meeting in San Francisco this year, and to participate in the Exposition which celebrates the completion of the Panama Canal.

Mining has had much to do with the development of the West and hence with the creation of those conditions which made the Canal, in a home sense, advisable. We may well say that mining is in fact responsible for the discovery of the Pacific coast, or at best its rediscovery under more favorable conditions. Until gold was found in California the vastness of the Western prairies, the snow-capped ridges of the Rockies, and the alkali deserts presented a series of barriers to the early settlers which they were not keen to try to surmount. To cross all three with primitive transportation facilities was a problem as difficult and as hazardous as the sailing of the unknown sea by Columbus some 400 years ago. The discovery of gold, however, brought a great number of people to the Pacific slope, and California's cities grew out of those mining camps. This magnificent city is one of the results.

FOSTER PARENT OF CALIFORNIA

Thus mining is the foster parent of modern California and, indeed, the underlying industry of the West. That is to say, the miners and prospectors soon learned to appreciate California's wonderful climate and soon learned the capabilities of its soil. This led directly to that great agricultural and horticultural development which has become famous the world over.

With the double productivity of the State proved, the railroads indulged in competitive campaigns looking to the construction of transcontinental lines to bring in the equipment to be used in the mines and to carry away the products of the soil. Thus began the trade exchange on which California grew.

These facts are mentioned because as miners we are proud of the strong influence which our industry has exerted upon a community so productive of great wealth that it finally called for and brought about the construction of the Panama Canal.

We have an interest in the completion of the Panama Canal as an engineering feat, namely, that in the execution of the work

mining methods were used, such as dredging, sludging and blasting. And, without the use of cement, which is also a product of mining, it would have been impossible to complete this work without excessive cost and delay.

RANKS FIFTH IN UNITED STATES

California is truly a great mining State, ranking as it does the fifth producer of the United States, with an annual value of the production of over \$100,000,000. This is more than the output of twenty other States. And the growth from nothing to this commanding position has been accomplished in less than seventy years. It is, therefore, proper that the highest tribute should be paid to the representatives of the mining industry in this State.

We are becoming accustomed to deal in very large figures in this country, but few not connected with the mining industry realize that the value of the mineral products of the United States in 1913 was in excess of \$2,500,000,000.

This convention at San Francisco was called mainly for the purpose of bringing together men interested in mining that they may appreciate that their purposes and their problems are one, even though their technicalities and their local conditions differ. To this end we afford opportunity for brief discussions, believing that with the ground cleared here of any and all misgivings the work will be taken up more actively and with more purpose when we return to our respective homes. With this in view, the list of addresses has been confined to the most urgent and important subjects. In keeping, this statement of your president is restricted to a brief review of the accomplishments of the year and to a few suggestions touching future needs.

The year just closing has been one of many and grave perplexities. The European war, which so seriously depressed the metal producing industry during the closing months of 1914, resulted in a healthy reaction to the copper and other metal industries in 1915. At the same time general business has endured a depression which had a detrimental and blighting effect upon the coal industry. This is especially true of the Central Western States. The exports of coal from the Eastern fields, or those adjacent to the seaboard, and the sales of coal to makers of war materials have in part offset the domestic trade losses.

To relieve their distress, strenuous efforts have been made by the coal operators of Illi-

nois and Indiana to devise and adopt permissible cooperative methods that would introduce economies and eliminate the disastrous and wasteful forms of competition, while leaving the competitive spirit full room in which to grow healthfully.

CURTAILED USE OF COAL

The increased use of water power, fuel oil and gas, the consolidation of light plants, and the establishment of electrical central power stations, have seriously curtailed the use of coal in various sections. These things, in addition to the unsettled trade conditions and to the influences growing out of the European and Mexican war situations, have brought about a serious situation for many coal fields; they have affected employers and employees alike. The aid of the Federal Trade Commission, which came into existence on April 1, has been invoked in an effort to find a solution for these problems. But the Commission feels that, as now constituted and endowed, it has no power to deal effectively with the situation. Even so, it is deeply in sympathy with the efforts of the coal owners.

This convention will be addressed by the ablest men in the country on the question of governmental regulation of business, hence it is not necessary to elaborate that subject here. Suffice it to say that it is the evident tendency that we are to become a Government by commissions; whether this will meet our complex needs is one of the grave questions of the hour. Its very gravity suggests that it should be the duty of every citizen to consider carefully this subject as the one most vital to his welfare and to the very existence of our form of government. Meanwhile, the enactment of the Clayton bill, which in a sense permits labor to do the very thing which the Sherman act denies to capital, suggests a growing political tendency to distinguish between forms of employment, degrees of wealth and the voting strength of the adherents of certain ideas which—seeing the indefinite and uncertain attitude of the courts—strikes at the very foundation of our Government. This Congress has been neither an antagonist nor a protagonist of capital. But it does stand firm on the doctrine that our Government must show partiality to neither. It insists that the National Congress and the State legislatures shall consider these economic subjects in terms of enduring principle and not in terms of relative voting strength of certain partisans.

It is not our belief that the report of the Commission on Industrial Relations as recently published was expressive fairly of the facts considered nor of any attitude which our Government can take. Its publication as a public document can work only mischief, and in consequence it is deplored.

WORKMEN'S COMPENSATION

Perhaps no social or economic subject has been so generously discussed as the propa-

ganda for workmen's compensation acts. Laws on this subject have been operative in a number of States for several years. This subject has been discussed frequently on this floor, and undoubtedly the statements here made have given helpful direction to many efforts to make these laws sane. Even so, there is great lack of uniformity and there is need that we address ourselves to that subject at once. For example, it is clear now that the compulsory feature, injected into the laws of several States, does not meet the approval of either the employers or the employees. This needs to be changed.

Also, employers generally believe that the industry should bear the cost of its accidents, but in many instances the decisions made by State commissions are manifestly unreasonable and result in litigation and ill-will, which is not desired by the employers and cannot be beneficial to the employees. A better way than now exists generally must be found for collecting and administering any fund collected for this purpose.

The attitude of the Government in endeavoring to obtain information which will assist it to find a solution for some of our vexing industrial problems is deserving of our commendation and should have our cooperation. The activities of the Federal Trade Commission are especially commendable in many directions, but in no one way more so than when it advised industries generally to adopt standardized accounting for the ready and accurate comparison of competing units and for the purpose of ascertaining costs.

The cooperation existing between the Bureau of Mines and the Geological Survey and the mining industry should be furthered by asking suitable appropriations for this work. In addition to the safety and life-saving features and rescue work, the complete utilization of our mineral resources should be encouraged. The great need for coal-tar products and its adoption for the separation of ores by the flotation process and other problems resulting in greater economy are deserving of the closest attention. Cooperation with the Federal Trade Commission in solving the problems of fair and unfair competition and an extension of trade relations is desired.

The question of control of the mineral resources, now withdrawn by the Government, is of the utmost importance. The present status is seemingly unsatisfactory to a great number, and it would seem advisable to bring the needs of the affected areas fairly before Congress to settle the present chaos with as little delay as possible and with justice and fairness to those directly affected.

TRIBUTE TO DECEASED MEMBERS

Reference to the development of the mining industry and the conservation of life and limb to those engaged therein would not be complete without recalling the untimely death of the first director of the United States Bureau of Mines, who, as a life mem-

ber of this Congress, was one of its staunchest supporters. A special session will be held on Tuesday, September 21, in commemoration of Dr. Joseph A. Holmes.

Death has also claimed other prominent members during the year. The West, in the death of Col. Thomas Cruse, has lost a prominent figure in the metal mining industry; the Southwest, Mr. James Elliott, who was our vice-president for Oklahoma and one of the leading figures in that section.

It is gratifying to say that notwithstanding the serious business depression, the finances of the American Mining Congress are in a healthy condition, and this in the face of the great drains upon our resources resulting from the expenses arising from the publication of the MINING CONGRESS JOURNAL. This has proved a valuable aid to this organization, if we are to judge by the many favorable comments received.

The organization of several new State chapters prompts the opinion that we are making headway, but it is evident that only by continued and unceasing efforts will we be able to accomplish our aim.

The cordial cooperation accorded me by the membership and the directors and officers is gratefully acknowledged.

ENLARGED HOMESTEAD TRACTS IN OREGON ARE INCREASED

Secretary of the Interior Lane has recently made an order which will increase the area designated under the enlarged homestead act in Oregon by more than 120,000 acres. These lands are in the eastern and central parts of Oregon, principally in Harney, Crook and Baker Counties.

The Secretary has also made an order, effective August 10, 1915, designating under the enlarged homestead act more than 60,000 acres of nonirrigable lands in Arizona, located in Maricopa, Navajo, Yavapai, Pinal, and Cochise Counties.

The President recently, on Secretary Lane's recommendation, issued an executive order excluding 6,960 acres of land from the White River National Forest, and providing for the restoration of the unwithdrawn public lands therein subject to disposition, to settlement only under the homestead laws from 9 o'clock a. m. August 17, 1915, until and including September 13, 1915, and thereafter to entry and disposition under the laws applicable thereto. The excluded area, which is in the Glenwood Springs land district, is situated along the eastern boundary of the forest, in the northwestern part of Colorado, in Garfield and Eagle Counties. It consists of a mesa varying in elevation from 8,500 to 9,000 feet above the sea level, and is more valuable for grazing than other purposes. The lack of water for irrigation gives it very little value for agricultural purposes.

COPPER IMPORTS DURING 1915 LESS THAN IN PREVIOUS YEAR

According to Department of Commerce figures, copper was imported into the United States during the fiscal year ending 1915, to the value of \$11,200,000. This compares with \$13,700,000 in 1914.

Copper manufactures imported during 1915 amounted to \$20,400,000, which is just half the importation of the previous year.

Imports of mineral oils in 1915 amounted to \$9,800,000. The importation of mineral oil in 1914 was \$13,700,000.

Bemis Bros. Issue Pamphlet

An interesting and effective setting forth of the merits of a product is accomplished in a pamphlet recently issued by Bemis Bros. Bag Co., of St. Louis. It has to do with ventilation of excavation work.

The pamphlet sets forth convincingly that the fabric tubing manufactured by Bemis Bros. furnishes an ideal flexible conduit for inducing air into excavations.

That there are opportunities for the use of this product in mining operations there is little doubt.

ACETYLENE MINER'S LAMP DISPLACING OLD STYLES

Three Hundred Thousand of this Type of Lighting Appliance in Use in Mines of the United States

Advantages and disadvantages of acetylene lamps for use in coal mines are pointed out by James W. Paul in a recent circular issued by the Bureau of Mines. In part, Mr. Paul says:

"Within recent years there has come into use in metal mines and in many coal mines in the United States a type of open-flame cap lamp for burning acetylene gas, the gas being made within the lamp by the use of calcium carbide and water. In some nongaseous coal mines this type of lamp has almost entirely taken the place of the miners' open-flame oil lamp, and in many metal mines it has replaced candles. The number of acetylene lamps in daily use in the mines of the United States is estimated at fully 300,000; 60 per cent of the lamps used in nongaseous coal mines and 15 to 20 per cent of those in metal mines being acetylene lamps. These acetylene-burning lamps are known to miners and to the trade as 'carbide lamps.' They are used in metal mines and in nongaseous coal mines, the use of safety lamps being required in gaseous coal mines.

"Acetylene gas has long been used for lights on bicycles and automobiles and in some houses. When acetylene gas was first used in lighting houses, bad machinery or improper care of the plants caused many accidents, and explosions followed by fires resulted in much

loss of property. Some persons who are considering the use of carbide lamps in mines may remember some of these accidents and desire information regarding the safety of the lamps. For the benefit of such persons the Bureau of Mines, which is directed by law to carry on investigations to make mining safer, issues this circular.

"A carbide lamp gives more light than a candle or miner's oil lamp, and the reflector used on some carbide lamps concentrates the light. Thus the careful miner has better protection from roof falls because he can detect dangerous roof conditions that he would not easily detect with an oil lamp or candle.

"The introduction of carbide lamps in metal mines and in nongaseous coal mines that are well ventilated should materially reduce the number of accidents resulting from poor light.

"Compared with a miner's oil-burning lamp or a candle, the time required for adjusting the carbide lamp to keep it burning properly is more than offset by the increased amount of work that may be performed in a day by its use.

GENERAL FEATURES

"Several models of carbide lamps are for sale, but certain features of design are common to all. A carbide lamp usually has two parts, one above the other, which can be screwed together. The top part holds water and the bottom part holds the carbide. The feed of water from the top part is regulated by a valve worked from the top or side of the lamp. A tube or compartment leads from the bottom part to the burner. In this tube or compartment are screens or felt to strain out solids and to keep them from clogging the burner tube. By means of a hook or handle the lamp may be fastened to the miner's cap, carried in the hand, or stuck on timber.

"Some models have reflectors back of the burner, others have none, and still others have the flame surrounded with a glass set in a frame.

ADVANTAGES OF CARBIDE LAMPS

"Some of the advantages that may be justly claimed for carbide lamps are as follows:

"As compared with an ordinary miner's oil lamp or a candle, a carbide lamp gives much more light.

"A carbide lamp is clean and the flame produces little smoke.

"The gases of combustion are principally carbon dioxide and steam (water vapor), and the acetylene is not injurious to health.

"The flame will not drop sparks and thus ignite explosives or anything that will burn as sparks from an oil lamp may do; however, the flame of acetylene will set fire to anything inflammable more quickly than will the flame of an oil lamp or candle.

"With the better light the working place can be more easily examined and dangerous roof conditions can be more readily detected.

"The general efficiency of the men is increased, because they are able to do more work with a better light.

"The cost of upkeep of carbide lamps is less than that of oil lamps or candles.

DISADVANTAGES OF CARBIDE LAMPS

"Some of the disadvantages in the use of carbide lamps are as follows:

"The flame, compared with that of an oil-burning lamp, is more easily put out by a sudden jar or by a shock to the mine air such as is frequently produced by blasting; however, the lamp may be quickly relighted if it is provided with some form of cerium igniter.

"When the flame is put out before the supply of carbide and water is used, the acetylene produced has a bad smell.

"As a carbide lamp will burn in air containing less oxygen and more carbon dioxide or black damp than will an oil lamp or candle, a miner using a carbide lamp may, without realizing it, work in air that is bad for his health or even dangerous to his life.

"The use of carbide lamps tends to lessen attention to the ventilation of the mine, especially as regards the presence of carbon dioxide or black damp.

"Careless or improper handling of carbide, such as permitting a quantity of it to come in contact with a pool of water in a mine, may cause an explosion or burn the men.

"Carrying carbide in the mine in a glass jar resulted seriously to a miner who accidentally dropped the jar in a wet place and ignited the gas.

"Cap lamps which have the gas generator attached to the belt of the miner are liable to leak at the generator or its tube connection, and the escaping acetylene gas may take fire and fatally burn the miner.

"Owing to the ease with which the flame may be put out by sudden jars or by a shock to the air, the carbide lamp is not well adapted for use by drivers, trip riders, or motormen."

SECRETARY LANE FORMALLY CANCELS AETNA CONTRACT

In its issue of last month THE MINING CONGRESS JOURNAL was able to announce the cancellation of the contract between the Department of the Interior and the Aetna Explosives Company. Since then official announcement has been made by Secretary Lane. The statement issued in this connection follows:

"Secretary of the Interior Lane announces the cancellation of the contract made between the Department of the Interior and the Aetna Explosives Company of New York, whereby the Aetna Company agreed to expend a sum of not less than \$200,000 in the development of the process, discovered by Dr. Walter F. Rittman, chemical engineer of the Bureau of Mines, for the manufacture of benzol and toluol from petroleum.

"It was explained that this action was taken after information had been received from Mr. A. J. Moxham, president of the Aetna Company, to the effect that such encouraging results had been obtained during

the period of experimental development of the process as to justify his company placing a plant on a commercially operative basis.

"The cancellation of the contract," Secretary Lane said, "is in accordance with the original understanding with the Aetna Company to the effect that the Government would withdraw from the contract as soon as benzol and toluol were produced by means of the Rittman process in commercial quantities.

"I am greatly gratified at the success which has been made in the mechanical development of the process, and I feel assured that the process has an important and successful industrial future, not alone as a source of two of the most valuable constituents of high explosives, but also as an efficient means of supplying dye stuff bases. The mechanical improvements which can reasonably be expected to follow from continuous operation and more general use are certain to give even better results than those so far obtained.

"It should be a matter of national satisfaction to know that, should the need ever arise, the country can depend upon this process, which is the result of the labors of a Government scientist, to furnish it with quantities of the raw materials for the manufacture of the most efficient explosives, lack of which has been one of the greatest handicaps of certain of the warring European powers. Of not less importance, however, is the peaceful industrial uses to which these same products can be put, now that it has been proven that they can be produced on a commercial scale, and I am hopeful that the established possibilities of the process will give a decided stimulus to important chemical industries.

"The success which has attended the development of this Government-controlled process in cooperation with private capital has demonstrated the wisdom of the arrangement, as otherwise the process would probably be in the laboratory stage, and its commercial possibilities would have continued to be a matter of conjecture. It is to be hoped that similar beneficial cooperation between the Government and business interests can be had in future, for the good of an entire industry.

"The Department of the Interior is ready to issue permits or licenses to any person or firm that can furnish assurances of good faith and that is desirous of employing the process.

"The Aetna Explosives Company has also agreed to develop the Rittman gasoline process, and I expect to be able to make announcement as to the success of this other process in large scale operation within a short time."

BUREAU OF STANDARDS PERFECTS IMPORTANT ELECTRICAL DEVICE

It is well known that a change in the voltage applied to the terminals of an incandescent lamp changes the candlepower, current, and in consequence the wattage

(watts equal volts \times amperes) and the watts per candle. If these changes are followed from point to point, relations among the variables may be found and plotted as characteristic curves. The equations of these characteristic curves for tungsten lamps have been found by the Bureau of Standards, Department of Commerce, and a special application of these equations has been made in a device which gives a solution of problems involving voltage, candlepower, and watts per candle.

In this device the volt scale is movable, and, by setting it to the other scales at a point corresponding to the observed watts per candle, values of per cent candlepower and of actual watts per candle may be read directly from the proper scales, or the converse problems may be solved. Use of this device results in a decided saving of time when compared with other methods of characteristic evaluation. In connection with the device are given tables of values used in its construction and practical examples illustrating scale settings.

The report upon this subject, just issued, has been designated Scientific Paper No. 253 and copies may be obtained without charge upon application to the Bureau of Standards, Washington, D. C.

IRON BACTERIA DISCUSSED BY GEOLOGICAL SURVEY EXPERT

E. C. Harder Is Making Field and Laboratory Tests of Phenomenon Little Studied in This Country

Interesting observations with regard to iron bacteria just have been made by E. C. Harder, of the U. S. Geological Survey. Mr. Harder is engaged at present in a detailed examination of the Cuyuna iron ore range in Minnesota. His laboratory work is being done at the University of Wisconsin. In addition Mr. Harder has made extensive experiments in iron ore in other parts of this country and spent four years aiding in the development of the important iron deposits at Camaguay. Mr. Harder's recent comment on iron bacteria follows:

"It has been known for many years that some of the higher bacteria are concerned in the precipitation of ferric hydroxide from iron-bearing waters. Thus *Crenothrix polyspora*, which is often abundant in city water pipes where the water contains a small percentage of iron, is held to be responsible for the frequent turbidity of the water in such places, due to the separating out of ferric hydroxide, and also for the filling of pipes with ferric hydroxide, which sometimes occurs. Certain other forms, like *Chlamydothrix ochracea*, *Spirophyllum ferrugineum* and *Gallionella ferruginea*, have been abundantly encountered in surface iron-bearing waters, where they form thick gelatinous deposits of yellowish-brown scum.

More recently certain lower bacteria have been described which show the same characteristics with regard to the precipitation of ferric hydroxide and which seem to be very abundant in surface waters.

Different investigators have attempted to explain this phenomenon in different ways. Some, notably Winogradsky and Lieske, believe that there is an oxidation from ferrous to ferric iron and that this furnishes the bacterial cell with energy. Lieske also claims that, as the iron is usually in solution as ferrous bicarbonate, the carbon dioxide set free by the oxidation is used by the cell for building up its tissues. Other investigators, like Molisch and Ellis, state that the precipitation of ferric hydroxide is a simple chemical phenomenon and is not connected with the life processes of the cell. They believe that the accumulations of ferric hydroxide upon these organisms or upon their remains is purely mechanical. At the same time they admit the association of iron bacteria with iron-bearing waters, and realize that ocherous scums in such waters consist largely of bacterial remains.

Most of the investigations on iron bacteria have been made in Europe, and relatively few investigators have concerned themselves with the problem. At the present time the writer is engaged in a field and laboratory study of these organisms, and it is hoped that this work may throw, some further light on the peculiar phenomena connected with their activities.

During the field work it has been found that iron bacteria are present in almost all iron-bearing waters, surface as well as underground. *Crenothrix* and *Spirophyllum* have been found in city waters, *Spirophyllum* and *Gallionella* have been found in the underground workings of mines even to a depth of several hundred feet, while *Chlamydothrix* and *Spirophyllum* have been found in surface iron springs and bogs. It seems that the bacterial flora of different localities varies. In some localities iron-bearing waters have a mixed flora, while in other localities one finds almost pure cultures of one or another of the higher iron bacteria. Thus some iron springs contain big, fluffy masses of *Chlamydothrix*, while others contain a brownish-yellow deposit consisting almost entirely of *Spirophyllum*. Some mines contain in their underground workings only *Spirophyllum*, while others contain mixed cultures. The reason for this difference is not known, but it is possible that the character of the salts in solution influences the bacterial flora.

Lower bacteria, of the coccus or bacillus forms which precipitate ferric hydroxide, are more difficult to study than the higher iron bacteria, as they can be distinguished only by their physiological activities. In order to determine the general distributions of such organisms in nature various iron solutions were inoculated with different types of water and soil and it was found that ferric hydroxide was precipitated from these solutions after an interval of time which varied with the different inoculations. These experiments show

the almost universal presence of organisms capable of precipitating ferric hydroxide. In order to show definitely that organisms were responsible for this precipitation, sterilized duplicates of the different cultures were prepared and these did not show any precipitation.

It was found likewise that solutions of different iron salts are affected in a different manner during these inoculations. In some solutions no precipitate forms, perhaps because the salts used inhibit bacterial growth. In other solutions, notably solutions of inorganic salts, the precipitation of ferric hydroxide takes place almost immediately, due to oxidation by oxygen present in the solvent. Certain solutions were kept under anaerobic conditions by passing carbon dioxide through them, and it was found that in some of them ferric hydroxide was precipitated, while in others no precipitation took place. In general the experiments have shown that precipitation may take place from solutions of ferric, as well as ferrous salts.

Up to the present the writer's attempts to isolate the lower bacteria present in soil and water, which are responsible for the precipitation of ferric hydroxide, have been unsuccessful, but it is planned to prepare and to experiment with various kinds of media in order to bring about this result. Until this isolation has been accomplished it will not be possible to study their morphology.

The morphology of the higher iron bacteria, unlike that of the lower, can be studied very readily, as they can easily be distinguished from other types due to their characteristic form. While it is comparatively easy to cultivate such forms as *Crenothrix* and *Chlamydothrix* in the laboratory, it is extremely difficult to isolate them from other forms in order to study their physiological processes. This is because of the fact that numerous lower bacteria find lodgment on the threads of these higher types, and are continually transferred with them.

One of the principal points of interest in connection with these investigations has been to note the relation that the iron bacteria might have to the formation of iron ore deposits. It has been claimed that they play an important part in the formation of numerous small deposits of bog iron ore, and it seems possible that their activities may in part be responsible for extensive beds of sedimentary iron ore as well. Further, the fact of finding iron bacteria in underground mines opens the possibility that certain underground deposits of iron ore have been formed by them.

Mr. Harder hopes soon to publish a detailed report on the results of these various investigations.

Big Demand for Enlarged Homesteads

During August there were 1,395 petitions for designation under the enlarged homestead act. During August 1,636,876 acres were entered under the 320-acre homestead provision.

EXPECT STATES TO CONTRIBUTE TO MINE EXPERIMENT STATIONS

With the approach of the assembling of Congress, interest is being revived in the Foster act, which provides for ten new mine experiment stations.

The act specifies that only three of these stations are to be established during the first fiscal year.

It will be recalled that it was impossible to carry out the provisions of this act due to the failure to provide an appropriation.

For the maintenance of these stations \$25,000 Federal appropriation will be the least upon which effective work can be done. Even this amount is inadequate, but it is hoped that the States in which the stations are located will contribute an equal amount.

It is the intention of those interested in this development of the Federal Government's work in the interest of mining to make these experiment stations as important to the mining industry as the agricultural experiment stations have been important to farming.

The locations of these stations will be left to the discretion of the Interior Department.

PERMANENCE OF VALUES IN CRIPPLE CREEK IS SHOWN

Details of the unusual discovery made in the Johnson mine at Cripple Creek recently have been brought to Washington by F. C. Schrader, of the Geological Survey.

This mine is on the southwest slope of Tenderfoot Hill, half a mile northeast of the town of Cripple Creek. This portion of the Cripple Creek area was thought to be barren prior to this find.

The strike which is exciting so much interest at present was made three months ago. The ore is being quarried like rock from an open cut. From a hole 40 by 20 feet and 20 feet deep, 300 tons of ore, averaging \$21 per ton, have been shipped. Sixty tons of the same class of ore are on the dump ready for shipment.

Mr. Schrader was in nearly all the deep mines in Cripple Creek during his visit. He says the values are remaining constant with depth in nearly every property. He is very much impressed with the prospects for profitable mining in the district for many years to come.

Mr. Schrader, in addition to his visit to Cripple Creek mines, looked after some land classification matters in the Durango district. He also visited the mines in the Leadville, Colorado Springs and Red Cliff regions.

A flourishing business is being done at the Abe Lincoln mine at Cripple Creek, he reports. This mine is fitted with specially constructed cages, and is specially prepared for visits from tourists. A large number of visitors are taking advantage of this opportunity to go through a mine.

INTERESTING REPORT ON WOOSTER OIL AND GAS FIELD COMING OUT

During the latter part of 1914, C. A. Boniene, of the Geological Survey, spent a short time in the Wooster oil and gas fields of Ohio, investigating geological structures. The report which will be based upon this work will be published in the near future. It is being awaited with more than ordinary interest by those in interested centers.

The region around Wooster, for the most part, is covered with glacial drift, hence the structure of the strata at the surface cannot be determined by obtaining elevations on these beds. It is highly probable, however, that the Clinton is far from parallel with the surface strata, therefore its attitude can only be determined by getting elevations of the field in the wells.

The structure of the Wooster pool, as shown by the elevation of the well heads, consists of a sharp anticline, with one or more branches, between which are rather deep depressions.

The wells away from the oil pool, however, are scattered so that the precise relation of the structure to the accumulation of oil and gas in this area cannot be determined conclusively. There is, however, more than a suggestion that the position of the oil pool bears a distinct relation to the main anticlinal axis.

OPPORTUNITY PRESENTS TO GAIN ITALY'S COAL AND COKE TRADE

According to advices received by the Chamber of Commerce of the United States from Charles F. Hauss, president of the American Chamber of Commerce in Milan, there is an opportunity, because of war conditions, for the United States to acquire coke and iron business in Italy. The demand for this metallurgical foundry coke and pig iron appears to be urgent.

Mr. Hauss informs the national chamber that war between Italy and Germany has stopped entirely the arrival of foundry coke and low-grade pig iron from Germany, and the local producers, which are the Salvay Process Works at Vado and Savona, near Genoa, are closed because they have no coal, and until the war is over very little coal and coke will come from England, from which country Italy has been importing about 70,000 tons of coke per year. The imports from Germany, Austria and Belgium amounted to 220,000 tons of coke per year.

"If the present feeling can be depended upon," Mr. Hauss informs the National Chamber, "Italy probably will never purchase from Germany again, or if she does, it will be after a long time, so that America never had a better opportunity to get and hold the coke and iron business in Italy."

THE MINING CONGRESS JOURNAL

PUBLISHED EACH MONTH BY
THE AMERICAN MINING CONGRESS.
Munsey Building. Washington, D. C.

Subscription Rate, per year..... \$2.00
Single Copies..... .20

Entered as Second Class Matter January 30, 1915,
at the Postoffice at Washington, D. C.

OCTOBER, 1915

EDITORIALS

DISPROPORTIONATE HELP GIVEN TWO INDUSTRIES

There are two great backbone industries. They are mining and agriculture. These are the industries that produce new wealth. There is not much difference in the annual amount of new wealth created by each. Agriculture in the United States receives \$28,000,000 worth of Federal aid each year. Mining receives something over \$1,000,000. It is evident that this is not equitable. Why does such a disproportion exist?

There are various reasons. Principal among them is the fact that agriculture is a widely distributed activity. There are few Congressmen in the House of Representatives who are not from districts in which farming is conducted extensively. On the other hand mining is an industry that is concentrated. It is confined to certain limited mineralized areas. It creates nearly as much new wealth as does agriculture but it takes up less ground in its operations. For this reason Representatives from districts in which mining is conducted, always are in the minority.

In the Senate the result is the same, although there is no State in the Union in which no mining is conducted. Senators are charged to look after the interests of the State at large but in many States mining is of such comparative unimportance that little attention is paid to it.

This is the main reason why agriculture gets twenty times the appropriation allowed to mining. There is no reason why the relationship should continue so disproportionate. The minority is not powerless. In fact the last Congress demonstrated that the minority could accomplish a great deal when it set about it determinedly.

Mining districts must be very careful in the selection of their Representatives. They must have men who are able and determined. They must be the never-tire sort who will fight for the equal recognition of mining. This is not to be interpreted as meaning that the mining districts are not well represented in Congress at present. Some of the most able men in the body come from the mineralized sections of the country.

The American Mining Congress tries to aid these men by pointing out specific places where legislation is needed. We try to add to their enthusiasm for more just recognition of mining. We always have found these men grateful for such assistance as we have been able to render them. They too are very quick to do anything that they think will better the mining industry.

It must be remembered, however, that Congressmen represent all the people. They have to look after the farmer, the manufacturer and all others who contribute to our composite industrial fabric. Consequently if the needs of the mining industry are presented to them in condensed and easily assimilated form it is more certain to receive early attention, as the manifold duties of a Representative put a premium on each minute of his time.

This gives an intimation of one of the ways in which the Mining Congress is aiding those having mining interests.

The American Mining Congress is very determined that the mining industry

shall receive more assistance from the Government. It is going to use every honest, above-board means possible to increase the appropriations which benefit mining interests. It is a big task but cooperation has made easy work of much greater undertakings.

BENEFITS GO TO 90,000 ;

1,500 PAY THE BILLS

Members of the American Mining Congress are uniting in an effort to increase the membership of the organization. This follows the appeal made last month by President Carl Scholz and the recommendations to this effect made at the convention of the Congress which was held last month in San Francisco.

It is pointed out that one-sixtieth of the mining men of the country are paying for the benefits resulting from the work of the Congress, which go to all engaged in the industry.

A campaign for members in any organization cannot make rapid headway unless aid comes from the individual members. No loss of time or great amount of effort is necessary. In the course of conversation with a mining friend it can be suggested that he establish a membership in the Congress. This is all any member is asked to do.

Every new member brought into the organization is an asset to every old member. It means that the Congress is just that much more representative of the industry and has just that much more additional funds with which to work.

It would be profitable for any individual member to take a day off and give it to earnest efforts to secure new members. This, however, is more than can be hoped for and results will be remarkable if each member will do nothing more than to mention the matter of membership incidentally when he happens to be talking with friends who are not yet affiliated with us.

Do you know a manufacturer of lumber who does not belong to a cooperative organization? It is a matter of fact that they are few and far between. Why should not mine operators benefit by similar systematic effort?

ENGLISH TECHNICAL PAPERS

PROFUSE IN COMPLIMENTS

English mining and other technical papers have complimented the United States Bureau of Mines and the Geological Survey so frequently of late that it is a matter of comment here. This commendation has not been of a general nature, such as is indulged in, oftentimes, simply to express friendly feeling. Distinctive features have been singled out. Particular activities are made the subject of comment. Reasons are given for their classification as being highly praiseworthy.

As these English technical papers are noted for their conservativeness and for their high standing, the frequent tributes that are paid to the experts in the Government service indicate the plane on which their research is being conducted.

We are in a position to know just the class of men engaged in the Government service whose work is attracting such attention abroad. It is to the interest of the mining industry that no inefficient scientists find places on the staffs of the bureaus which work in the interest of the mining industry. If there should be any tendency to allow politics or any other influence to exert a depreciating effect on this standard, we would be very prompt to raise the cry of alarm. There is scarcely a day in which some member of the Mining Congress staff in Washington is not mingling with the men who have in their charge the work being done with the money appropriated to stimulate and make more profitable the mining industry. We marvel at the ability of the Government to secure the services of such able men for the salaries paid.

The Bureau of Mines and the Geological Survey are in the hands of directors of unusual ability. They have mapped out programs which promise results which will be beneficial to every man interested directly or indirectly in the mining industry. Their only handicap is the limited appropriations which are allowed them. Each expects to recommend additional expenditures for the coming year. It is the duty of every

man with mining interests to lend what influence he can toward the accomplishment of this very evidently necessary procedure.

DAY OF "ROUGH-NECK" TACTICS HAS PASSED

Need for careful judgment in the selection of the men who have direct jurisdiction over the employes in mines is becoming increasingly apparent.

The day once was when the operator of the mine knew every man on his force by name. In most cases the operator worked side by side with the men employed. In those days labor troubles practically were unknown.

The employer knew the difficulties which confronted his men. If there were sickness in the home, he knew all about it. If financial troubles came, he was in a position to extend intelligent aid. The relationship between employer and employe was such that each could estimate the other at his real value. As a result, congenial spirits sought each other out. The employe frequently worked with the same employer for years.

This relationship is held by students of labor problems as the ideal condition which surround employer and employe. When it existed in the mining industry friction between operator and workman was at its minimum.

After mining became a more systematized business, operations were undertaken on a larger scale. The administrative duties of the operator became so heavy that it required his presence almost continually in the office. He was not in a position to know every time John Smith had trouble. He was not on hand to sympathize and help smooth things out.

Perhaps the salaried foreman over John Smith was not interested in anyone's troubles but his own. He perhaps was not slow in letting this be known. Smith naturally resented this attitude, and an important factor in making the mine a success was lost.

The salaried boss must take the place, in so far as it is possible, of the employer

who once worked at the face with the men. He must be more than a foreman—he must be a diplomat. He should be selected with the care with which the operator selects a physician for himself when attacked by serious illness.

Nine-tenths of all strife is due to misunderstanding. The fraction is even greater when applied solely to labor strife. Much of the friction now in existence can be reduced by systematic efforts on the part of the representatives of the operator who come in direct contact with the men.

The day of the "rough-neck" is past. A man who relies on intimidation to enforce discipline is on the wrong track. It has been demonstrated in thousands of instances.

The most lowly workman is entitled to fair treatment. He would get it if the average operator were handling his case personally.

In many large operations it is, of course, impossible for the owner or owners to handle such details. It behooves them, however, to pay the most careful attention to the selection of their subordinates, all the way down the line.

IS STATE DEPARTMENT OF THE WAGE EARNERS

There is a widely disseminated idea that the Department of Labor of the Federal Government represents capital and labor alike. The public, speaking generally, seems to be of the opinion that this Government agency is working just as much in the interest of capital as it is on the behalf of labor. This is not the case. The Department of Labor is maintained in the interest of the employes. As Louis F. Post, the Assistant Secretary aptly put it, "the Department of Labor is the state department of the wage earners of the United States. Just as the State Department represents the United States in matters of foreign relations, the Department of Labor endeavors to do with respect to the affairs of employes."

It is the intention of the Department of Labor to be as fair and free from bias as is the Department of State when it

makes representations to a foreign power. In matters of international relationship, it has been proven repeatedly in the history of the world that it never pays to try to "put one over." This Government justly prides itself on the high plane that it has maintained in its dealings with other countries. No unfair advantage has been taken to gain anything for the United States.

This same idea is being striven for in the Department of Labor, Mr. Post advises us. To have the wage earners represented by broad-minded men, who can lift themselves above the narrowness that often characterizes the attitude of workingmen's organization, is a blessing both to the employees and employers.

For the best interests of all, however, sight should not be lost of the fact that the Department of Labor is working as vigorously as it can for the employees. The Secretary of Labor by statute is charged with the duty "of fostering, promoting and developing the welfare of the wage earners of the United States, improving their working conditions and advancing their opportunities for profitable employment."

GILA COUNTY SECTION

DOING GOOD WORK

Patrick Rose, manager of the Gila County section of the Arizona Chapter of the American Mining Congress, advises that that section is getting along splendidly, and the membership is increasing rapidly. The section has held no recent public meetings on account of the extreme hot weather, but with the coming of cooler days, they expect to take active steps to secure a "Workmen's Compensation Law" fair alike to employer and employee. We feel sure the Gila County section will do its part in bettering mining conditions in Arizona.

Complete Excavation for Laboratory

Excavations for the new technical laboratory of the United States Bureau of Mines at Pittsburgh have been completed. The excavations for the new buildings are extensive, aggregating 72,000 cubic yards.

"We think that the American Mining Congress deserves the general support of those engaged in mining. We need a parliament of mining operators and engineers to assemble periodically with a view to crystallizing opinion on matters of moment to the industry.

"The social obligations of good citizenship call upon the members of the profession and the bigger brotherhood of all those actually engaged in mining operations to unite in giving effective support to the American Mining Congress."—Extracts from an editorial in *The Mining and Scientific Press* of September 18.

SURVEY COOPERATES WITH CITIES IN SEARCH FOR OIL

Cooperative work has been undertaken by the United States Geological Survey and the municipalities of Dallas and Fort Worth, Tex. Geologists have been furnished by the Survey to make a careful examination of the territory in the vicinities of these two enterprising Texas cities, with the object of ascertaining if the formation is favorable for commercial deposits of oil and gas.

E. W. Shaw and G. M. Matson, two of the Survey's oil and gas experts, are now engaged in this work. They will be in the field two months. No drilling will be done, but a careful examination of the outcrop of all strata will be made.

The salaries of the geologists on this work will be paid by the Geological Survey. This includes the time in the field, as well as that occupied in preparing reports a little later. All field expenses and temporary assistants will be paid by the municipalities.

A provisional report upon the region of the examination will be furnished by January 1.

STEEL COMPANY DEVELOPS EFFECTIVE ACCIDENT REPORT

The Bethlehem Steel Corporation, after some time has developed what is considered a most effective accident report. The only objection is that for every injury at least twelve special blanks must be made out, many of these being in duplicate or triplicate. Under present conditions it is considered practically impossible to do away with many of the forms now being used.

Visits Alaskan Field Parties

Dr. A. H. Brooks, who has charge of the division of Alaskan Mineral Resources, of the Geological Survey, is now in southeastern Alaska. He is visiting the field parties who are studying the geology of that section.

STRESS BEING PLACED ON PRACTICAL WORK AT PITTSBURGH SCHOOL OF MINES

Students Required to Reside at Workings During Portion of Year—Managerial Training Being Made Feature of Pennsylvania Institution—Both Coal and Metal Mining to Be Covered

The University of Pittsburgh in its School of Mines has inaugurated for this school year a course of study planned to meet the needs of students intending to qualify for positions in the management or administration of mining companies. Up to the present time, courses in mining have been more or less thorough in supplying the students with the technical facts necessary for successful pursuit of the profession from an engineering standpoint, and in providing some opportunity for practice in the various fields of study. Mathematics, physics, chemistry and geology, in their many subdivisions, form the basis for such a course, and are supplemented by the applications of these subjects to mining methods, and to civil, mechanical and electrical engineering, as these are used in mining.

The more progressive mining schools of the country include in their courses frequent visits of inspection to working mines, where the principles laid down in classroom and textbook are exemplified. In some cases the trips may occupy only a part of a day, while in others they last for several weeks, and many different mines are visited. A few, among which may be mentioned the University of Pittsburgh, go farther than this, and provide for temporary residence at a mine.

PRACTICAL INSTRUCTION

The students go out singly, or in small groups, usually in the summer, to certain mines at which the owners cooperate with the School of Mines in affording the student opportunity to study every feature of the mining operation. He works with the surveying party, accompanies the officials on their rounds of inspec-

tion, helps in the drilling and blasting, learns the operation of the mine machinery, such as fans, pumps, locomotives and hoisting apparatus, and studies the system of mining, together with the sanitary, housing and amusement conditions of the mining towns. In the course of three summers spent in this way, the student acquires a personal knowledge of mines under a variety of conditions. The results have been of great benefit, both to the students and to the companies, according to M. E. Wadsworth, dean of the school, writing in the *Pittsburgh Gazette*. The students on graduation have a much broader acquaintance with mining problems than they could acquire in any other way, and so are more valuable to employers at the beginning of their engineering careers. The companies find the services of men from such a school superior to those of men from institutions following only the accepted routine of textbook and recitation, and always prefer the former class.

FEATURE OF PROMOTION

While the system outlined above has been very successful in preparing students for the technical department of mining, it does not equip candidates for the management of mining enterprises. Some mining engineers have become managers, directors and presidents of companies, and have been of value to their companies because of their combined technical and administrative ability. But such promotion is much less common than it should be, because the average mining graduate is not equipped for service in any but the technical department, and consequently he does not become qualified until after a number of years of experience, if ever.

In order to overcome this objection, instruction has been provided for several years by the University of Pittsburgh in such branches of mining as costs, accounting, law and management. The improvement now planned is a more radical one, the establishment of a distinct program of study, to be known as the Management Option, for students who desire to devote a considerable portion of their time to problems of mine administration. This is to be accomplished without sacrificing the range or thoroughness of the present technical mining course.

STUDY OF COSTS

Each of the four subjects mentioned above will be amplified considerably beyond the limits of its present treatment, and to provide the additional time necessary, some of the specialized technical subjects now required of all students will be dropped from the curriculum of the Management Option. Teachers of special qualification, both as to training and experience, will direct the work in each case.

The study of costs of production will embrace both the metal and coal mining, and will cover the principal mining districts of the world. The graduate may find himself in a locality where low costs are of greater importance than perfection of mining method. Actual costs from different companies will be furnished to the student, who will analyze them in the light of the lectures given by the instructor, and investigate the underlying reasons for the results in each case.

A fraction of a cent is frequently a large percentage of the net profit on a pound or ton or other unit, as the case may be, of the product of a mine. The necessity of adequate accounting systems, not merely bookkeeping, but a thorough study of costs, is apparent. When such analysis has been made mining costs have often been reduced below what was previously considered a minimum.

Mining law and the court decisions bearing on it are now a necessary part of the mine official's personal equipment. In the study of the mining laws and those general laws relating to mining,

particular attention is given to those of districts where students of the school are most likely to be employed.

SCOPE OF COURSE

Under the head of management are included such problems as selection of the working force, division of duties, wages, labor organization, welfare work, efficiency, organization and financing of corporations and the general economics of mining. In the summers, the student will investigate the actual management conditions at certain mines where the facilities are freely provided by the owners.

On completion of the four years' course, including the management option, the degree of Engineer of Mines will be conferred. The graduate in this option should be so well equipped for service in this comparatively new field of activity that he will be in great demand among mining companies, and at a salary above that now prevailing for engineers. Besides, his advancement to a position of large responsibility should be rapid.

Although no public announcement of the new option has been made up to this time, the plans have come to the notice of a number of mining men in different parts of the country. Many of these, among whom are some of the most prominent in the mining profession, have expressed to the dean of the School of Mines their warm commendation of the proposed Management Option and their belief that it will meet a pressing need of the mining industry throughout the country.

Buyers of Tungsten

Owing to the interest in tungsten, the following list of buyers is given: Crucible Steel Co. of America, Pittsburgh, Pa.; Atkins Kroel & Co., 311 California St., San Francisco, Cal.; Bethlehem Steel Co., South Bethlehem, Pa.; Chemical Products Co., Box 1812, Washington, D. C.; Electro Metallurgical Co., Niagara Falls, N. Y.; Primos Chemical Co., Primos, Pa.; Taylor David & Co., Boston Bldg., Salt Lake City, Utah; Vanadium Alloys Steel Co., Latrobe Pa.; Sam E. Wegland, 117150 Michigan Ave., Chicago, Ill.; Wolf-Tongue Mineral Co., Boulder Colo.; Henry E. Wood & Co., Arapahoe St., Denver, Colo., and York Metal & Alloys Co., York, Pa.

URGES MORE ACCURATE METHOD OF DETERMINING INDUSTRIAL HAZARDS

Albert H. Fay, of Bureau of Mines, Points Out Reasons Why Present Methods Are Unjust to Operator, Miner and Insuring Organization—Yearly Hours Worked Vary from 1500 to 2400 in Different States

"The enactment of accident compensation laws in the various States calls for a more accurate method of determining industrial hazards than those now in vogue, viz.: on the basis of the average number of men employed. The prevailing method of determining the mining risk, on the basis of the number of men employed, is not just to the operator, the miner or the State, and especially so when comparing one State with another."

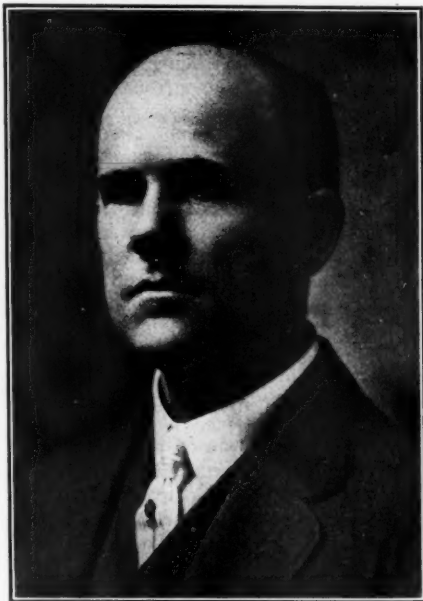
So said Albert H. Fay, of the United States Bureau of Mines, at a meeting of the Bethlehem (Pa.) Chapter of the National Safety Council held September 10 in the offices of the Bethlehem Steel Co., at which time a standing basis for calculating accident ratio was discussed.

"The time element should be taken into consideration—that is, the actual length of time (preferably hours) that the men are exposed to the underground dangers," continued Mr. Fay. "In some States the eight-hour day prevails, while in others the ten-hour day is common. Thus the ten-hour man is exposed to the risk 25 per cent longer than the eight-hour man. Furthermore, the eight-hour State may work only 150 to 175 days per year, as compared with 240 to 250 days for the ten-hour State.

AVERAGE HOURS VARY

"The average number of hours worked per man in the coal mines of the United States, over a ten-year-period, is 1,909. Some States for the same period average over 2,400 hours, while others work less than 1,500 hours per year. Evidently the hazard in these two extremes is apparently not the same, and by no means is it comparable. Yet comparisons are made on the basis of the average number of men employed (omitting the time element), and almost invariably the State working the smallest number of hours has the lowest rate, and is looked upon as a model State and secures a low insurance rate.

"As an example, one State with an actual fatality rate of 2.94 per thousand men employed, averaged less than 1,500 hours per man per year (a ten-year period), and another State in which the men worked considerably more than 2,000 hours, had a fatality rate of 4.25 per thousand. Here is shown the need of a common denominator to reduce the two States to the same basis. Taking 2,000 hours as a standard year (1,909 hours being the United States average for ten years), which is not far from actual conditions, and calculating a



ALBERT H. FAY
Statistician of the U. S. Bureau of Mines.

rate on the basis of 1,000 full-time 2,000-hour workers, the rate for the former State becomes 3.94 per thousand instead of 2.94, and the latter State becomes 3.96, as compared with 4.25, showing that the hazard does not vary so much from one State to another when the time element is taken into consideration.

"The insurance rate in the two States should be practically the same, yet on the prevailing method of determining risks, the hazard in the latter State is above 45 per cent higher than the former, which certainly is an injustice to one State, while in the other State the premium may not equal the actual hazard.

SUGGESTED SOLUTION

"A common year of a certain number of man-hours seems to be the most rational basis, as it places all of the States on equal footing. It does not matter whether this standard year be 2,000 or 3,000 hours, so long as a common denominator is used. If 2,000 hours is made

as a basis, an additional 50 per cent will give a 3,000-hour basis for comparison with other industries in which the 3,000-hour year is used.

"Another element that has an influence on fatality ratio is the system of mining. Some methods must necessarily be safer than others, yet exact data are lacking. Nationality, occupation and experience, each has an influence for good or ill. In the majority of the inspector's reports on accidents much of this information concerning the injured man is given but, unfortunately, the number of men of each nationality, the number engaged in each occupation, and the classification of men by length of experience is not given, nor is it possible under the present system to obtain exact data as to the actual number of hours worked by each class of men. All of this information is desirable, and when once obtained a time risk may be determined for any group of men by nationality, age, occupation and experience."

MANNING HONORED BY CHICAGO COAL OPERATORS

The Illinois Coal Operators' Association September 11 gave an informal luncheon to Van H. Manning, the director of the Bureau of Mines, who stopped in Chicago a day on his way to San Francisco. The luncheon was arranged on very short notice and thus it was not possible to have brought to Chicago the outside coal men who would have been very glad to meet Mr. Manning. Rather the banquet was under the auspices of the Illinois association, being arranged by C. M. Moderwell, as president, but there was included most of the local operators, whether they were from Illinois or Indiana, and some professional men. The luncheon was held at the Union League Club and only very short addresses were made by Mr. Moderwell, Mr. Manning, Geo. S. Rice, F. W. DeWolf and W. S. Bogle. Those who attended the luncheon were: Mr. H. C. Adams, of the Jones & Adams Coal Co.; Mr. Fred Schroeder, of the Purity Coal Co.; Mr. W. S. Bogle, of the W. S. Bogle Co.; Mr. Jas. Needham, vice-president of the Illinois Coal Operators' Association; Mr. Geo. B. Harrington, of the Chicago, Wilmington & Franklin Coal Co.; Mr. G. W. Traer, of the Illinois Coal Operators' Mutual Employers' Liability Insurance Association; Mr. J. Winchester Holman, president of the *Mining & Engineering World*; Prof. H. H. Stoeck, of the Mining Department, University of Illinois; Mr. Carl Scholz, president of the American Mining Congress; Mr. Van H. Manning, director United States Bureau of Mines; Mr. C. M. Moderwell, of the C. M. Moderwell Co.; Mr. Geo. S. Rice, Bureau of Mines, Pittsburgh; Mr. F. W. De Wolf, director Illinois Geological Survey, Urbana, Ill.; Mr. Jno. H. Swift, Bureau of Mines, Washington; Mr. Chas. I. Pierce, of the Big Creek Collieries Co.; Mr. F. C. Honnold, of the Chicago & Big Muddy Coal Co.; Mr. H. L. Smith, United States Bureau of

Mines, Urbana, Ill., and Mr. Geo. H. Cushing, of *The Black Diamond*.

NEVADA MINING CAMPS SHOW INCREASED OUTPUT

The United States Geological Survey has received reports from V. C. Heikes of satisfactory conditions in Nevada that promise well for the 1915 output of metals. Since May, the mines and mining districts of Nevada are more lively than they have been in years and more ore is being shipped than for months past.

Over 100 cars of ore per month are being shipped from the Yellow Pine District, in Clark County, where nearly every zinc and copper property is working, but zinc producers without contracts for their product are experiencing a hard time selling it at the present high prices. The silver mills at Tonahpah are operating at usual capacity, treating about 10,000 tons of ore weekly.

On the Comstock lode the pumps of the Mexican and Ophir winze have lowered the water to the 2,700 level. Nothing that has happened on the Comstock in twenty-five years is of such importance as a vast quantity of virgin ground that has been opened up in the north end mines. In May the first ore in thirty years was brought up from the 2,500 level of the Comstock. Rochester District is equipped with a custom mill, and recently made a second shipment of silver bullion valued at \$26,000 after a run of sixteen days. The Nevada Consolidated mill and smelter at Ely are operating at full capacity. A flotation process has been added to its concentrator. At Thompson, the Mason Valley smelter remains idle and nothing is being made public concerning the success of the leaching process on Nevada-Douglas copper ores. The gold production for Nevada will likely not exceed the output of 1913, although greater activity has been reported from Seven Troughs and Goldfield Districts.

Spelter Data Attracts Attention

Considerable attention was attracted September 9 by the publication of statistics showing the production of spelter from January 1 to June 30. These statistics were compiled by C. E. Siebenthal, of the Geological Survey.

In addition, comment is made upon zinc production, consumption, stocks, importation, exportation, price, value, new smelter construction and total smelter capacity.

A list of the active smelters in the United States also is given.

Prepare Report on Antimony

Due to the unusual interest in antimony, the Geological Survey is preparing a report upon this metal. It is expected it will be ready for distribution in three months.

PLATINUM PLAYING PART IN MUNITIONS MANUFACTURE

Recent Increase in Price Results in Speculation as to its Causes—Report to be Published

Platinum is playing a part, along with most other metals, in the manufacture of munitions of war.

It is used extensively in the manufacture of contact mass. This consists of finely divided platinum precipitated on asbestos, or anhydrous magnesium sulphate.

Contact mass is used in the manufacture of sulphur trioxide (SO₂) and very concentrated sulphuric acid (oleum). Each is essential to the manufacture of high explosives.

While a considerable stock of platinum is tied up in contact mass, the metal is not used up, and will only be removed from the market during the period of abnormal manufacture of explosives.

Some speculation is being indulged in to account for the recent increase in the price of platinum. In this country by far the greatest quantity of the metal is used in the jewelry and dental industries. As is well known, 90 per cent of the Russian output is controlled by a French company.

Russian exports have been decreased greatly by the embargo which specifies that no more than \$275 worth of the metal may be sold to one person. When it is considered that platinum is worth \$45 an ounce, the amount of exports cannot be large.

To discourage shipment of platinum from Russia further, a 30 per cent ad valorem export tax has been levied. The American production is far below the amount of platinum consumed in the United States. Last year 3,000 ounces of platinum were produced here. The sales of platinum during the year were 40,000 ounces.

J. M. Hill, of the Geological Survey, the author of the 1914 report on platinum, has written interestingly concerning the peculiar status of this metal at present. This report will be published shortly.

Owing to the curtailment of the European supply of platinum, increased attention has been given to the deposits of the metal in Colombia. These deposits are found in the Choco district on the Atrato and San Juan rivers. Considerable development has been done on these deposits, but entirely by an English company. At present the production of platinum in this region is being sent to Europe. Owing to the absence of American operators there a number of refiners on the eastern coast of the United States, who are very anxious to secure new metal, but are not able to get any of this output.

The placer miners of California and Oregon saved 570 ounces (troy) of crude platinum in 1914, as compared with 483 ounces in 1913, according to statistics collected by Mr. Hill.

The greatest increase in production was in Oregon, which showed a gain of 85 ounces.

From this crude platinum 525 ounces of metallic platinum were extracted, valued at \$23,625 figured at the average market price, \$45 an ounce. The Boss gold-copper-platinum mine, near Goodsprings, Clark County, Nev., produced 110 ounces of platinum.

Besides the platinum obtained from sands and platinum ore 2,906 ounces of this metal were obtained from new material, of both domestic and foreign origin, by smelters and refiners of gold and copper bullion and mattes.

The secondary platinum industry handled 40,826 ounces of platinum, which was obtained from refining scrap metals and sweepings of the jewelry and dental trades.

Even if the imports of foreign platinum were greatly reduced, there are apparently sufficient stocks of this metal in the United States to meet domestic requirements. The price of platinum, which rose to \$50 an ounce just after the war was declared, had by July, 1915, fallen to \$37 an ounce, or \$8 an ounce less than the average in 1914. Another explanation of this low price may be the increasing use of tungsten, molybdenum, and nickel-chrome alloys in the electrical industry, and the use of plated ware in jewelry and dental work.

The following table shows the production of platinum in 1913 and 1914:

Country	1913	1914
Russia, crude.....	250,000	241,200
Canada, crude.....	50	30
New South Wales and Tasmania, crude.....	1,275	1,248
Colombia, crude.....	15,000	17,500
United States domestic, crude.....	483	570
United States refined platinum from foreign and domestic matte and bullion.....	1,100	2,905
Borneo, Sumatra, and others.....	200

OIL FIELDS IN WOODSFIELD REGION OF OHIO ARE PROMISING

Preliminary reports on the geology of oil and gas fields in the Woodsheld and Summerfield quadrangle in eastern Ohio have been completed and will be published shortly by the Geological Survey.

These areas are of special interest to oil men on account of the large number of oil fields which are productive at one place or another. For that reason, exploration drilling has been carried on very thoroughly. There are at least 2,000 holes in the Woodsheld quadrangle alone. There are splendid possibilities of the productiveness of certain of the oil pools.

Field work necessary for the collection of the information for the report mentioned was done during the summer of 1914 by D. D. Condit, assisted by R. V. A. Mills and Frank Reeves, geological aides.

Observation on the geology of coal beds and other mineral resources in the area, in addition to oil and gas, will be treated in a separate report, which is in preparation.

INFERIOR MINING ENGINEERS ARE RESULTING AS SCHOOLS MULTIPLY

**Prof. Robert Peele, of Columbia University, Points Out Dangers in Establishment
of Institutions without Sufficient Financial Support to Provide
Enough Instructors or Proper Equipment**

Due to the establishment of schools of mines without enough financial support to employ sufficient instructors or to equip laboratories properly many inferior mining engineers are being turned out.

The number of mining schools has doubled in the last twelve years.

The real need of these schools is doubted.

No course of engineering study comprises so great a variety of subjects as does mining engineering.

These are some of the conclusions of Professor Peele in the following communication to THE MINING CONGRESS JOURNAL.

Professor Peele is the author of the article on mining engineering in the Cyclopaedia Americana. In 1907 he contributed a very valuable paper to Volume 10 of the Proceedings of the American Mining Congress. He has written profusely on mining subjects and is recognized as one of the country's leading authorities on mining engineering.

BY ROBERT PEELE

Professor of Mining, Columbia University

Since 1903 the schools of mines, or departments of mining in colleges and universities of the United States have increased from about thirty to probably nearly or quite double that number. The establishment in the past twenty or twenty-five years of this excessive number of schools is due to several causes, among which are the following:

1. As I have heard it expressed by a professor of mining in a Western college, it is often a matter of pride with the citizens of a State that their home institution should have a full university organization, including a school or department of mines, if the mining industry of the State is of any importance.

2. In other cases, the cause is to be found in the ambition of faculty or board of trustees or other governing body, to increase the scope of their institution, or its number of students, or both.



ROBERT PEELE

Of the School of Mines of Columbia University,
New York City.

3. In some States, where mining is a chief industry, the idea is prevalent that mining engineering can best be taught in or near a mining region, so that the student may conveniently visit and study the mines themselves. If the schools so situated actually avail themselves of their opportunities, it must be admitted that there is something in this idea; but, it has come to my knowledge in a number of cases that in these very schools the students are required to do much less systematic study in the mines than the students of other and better organized schools situated at a distance from mining centers.

4. The desire of parents to send their sons to their State institution has unquestionably exerted considerable influence. A smaller expense for traveling, living and tuition,

naturally appeals to those who have to count the cost.

5. Ignorance, or at least lack of full appreciation, of the elaborate and costly plant or teaching organization required to equip an efficient school of mines, I believe is an important factor.

DOUBTS NEED FOR SMALL SCHOOLS

There may be still other reasons, but these five seem to me to account for the establishment of many small mining departments or schools, the real need for which may well be doubted.

No course of engineering study comprises so great a variety of subjects as mining engineering. In this sense it is the broadest of the engineering courses. Besides the mathematics, natural sciences (especially geology, metallurgy, chemistry, and physics) and the specific mining and metallurgical subjects, the curriculum must include considerable parts of civil, mechanical and electrical engineering, since these have their part in the equipment and operation of mines and reduction works. In civil engineering it is indispensable to include the theory and practice of surveying, with the elements of railroad surveying, also strength of materials, hydraulics and graphic statics (the foundation of the design of engineering structures). Electrical engineering has become increasingly important in recent years, so that a mining engineer must have a reasonably good working knowledge of the principles and construction of both direct and alternating current machinery, and of electric transmission; also the principles of electro-metallurgy and electro-chemistry. In mechanical engineering are the fundamental subjects of mechanical drafting, thermodynamics, engines and boilers, gas and oil engines, and the engineering of power plants. I have not aimed here to give a complete list even of the important subjects which should be contained in an efficient curriculum for a student of mining engineering, or metallurgy, but only to outline the ground which experience has shown to be essential, and to illustrate my contention that a proper course in these subjects cannot be given in an institution which does not possess well equipped engineering departments, provided with their respective laboratories.

REQUIRE PRELIMINARY COLLEGE TRAINING

In very recent years several of the more thoroughly organized schools of mines have been put on a graduate basis. That is, recognizing the danger of excessive specialization on an insufficient foundation, these schools now require that entering students shall have had a preliminary college training in which science subjects are emphasized. This change is generally accompanied by a reduction in the length of the graduate engineering course from four to three years.

The organization of adequately equipped departments of instruction, as outlined above,

with their numerous laboratories, involves a heavy initial outlay and the annual maintenance charges are beyond the reach of any but strong and largely endowed institutions.

It is my conviction that the most efficient school of mines is one which is comprised in a group of technical schools, in turn forming a division of a university. Each of the technical schools has the staff and equipment for specializing in its own subjects, and the mining students have the advantage of receiving their necessary instruction in civil, electrical and mechanical engineering from specialists in each subject.

Conversely, the chief weakness of the small school, or institution attempting to teach mining is the fact that it is self-contained, instead of being intimately bound up with a strong group of allied engineering schools or departments of an amply endowed institution. Each member of its small staff is expected to teach a number of subjects. He can specialize in none. He must often give instruction in several quite unrelated subjects. It is difficult or impossible for him to keep abreast of the times, and it can hardly be doubted that his work is often of inferior quality. In past years I have sometimes been asked to recommend a candidate for a professorship of mining and metallurgy, or a man to teach such diverse subjects as surveying, assaying and strength of materials. In these latter days, as the engineering fields have broadened, no one man can possibly teach mining and metallurgy, any more than he can teach civil and mechanical engineering.

TURN OUT INFERIOR MEN

It seems unnecessary to elaborate this view of the question. The small, poorly supported, imperfectly organized and insufficiently manned, mining schools and departments of mining, of which there are so many examples in this country are turning out inferior men. They attract by the cheapness of their tuition charges, or by reason of their geographical location, many young men who would otherwise go to the stronger and better equipped schools. I believe the numerous small State institutions are most to blame for this condition of things. In saying this I do not refer to those well-known State schools which are doing unquestionably good work, but to those which are so poorly supported and equipped that they are positively detrimental to the mining industry.

CONDITIONS VARY MARKEDLY

Twenty-five or thirty years ago, when electrical engineering as a study was barely thought of and when mechanical engineering was far less developed and specialized than now, the student of mining was not burdened with such a multiplicity of subjects. A large proportion of the work in and about mines was formerly done by manual labor, and the limited variety of mining and ore-dressing machinery made the equipment and operation

of mines a simpler matter. The attention of the student was therefore concentrated in a narrower field, in which more thorough work could be done. More time could be given to chemistry, physics, mineralogy, and the application of these sciences to mining, metallurgy and ore-dressing. On the other hand, it is probable that the graduate of that period had less grasp of the practical side of mining as a branch of engineering. The young men of today are in constant, though often unconscious, touch with the multitude of mechanical devices which play their part in our daily life, and they are inevitably brought into contact in one way or another with engineering works of the most varied description, all of which cannot fail to develop the intelligence of things practical.

But these very conditions have so broadened the field of study that the customary four years' course is in danger of being overcrowded in the effort to keep abreast with the times. If the student's work be done in haste and under a feeling of pressure, his mental vision for the time being tends to become restricted. The development of his deliberative faculties may be impeded by living too much in an atmosphere of facts, for the proper assimilation and arrangement of which he has insufficient time.

ERRORS IN INSTRUCTION

In presenting some of the engineering subjects, undue prominence may be given to descriptions of methods and plant, the details of which vary from time to time as practice changes and advances, and too little to principles on which practice is based. The teaching of facts is one of the lower functions of the instructor, and when it is done without impressing upon the student the reasons for the existence of these facts and their relations to one another, the chief purpose of education is only partially fulfilled.

Undoubtedly the tendency of the present time is to consider the purely utilitarian aspect of technical education as first in importance. The student himself is usually much more concerned about the kind of position he will be able to secure after he graduates, and the salary attached thereto, than about the character of the training that will fit him satisfactorily to fulfill the requirements of that position and insure a larger measure of success in after life. Both he and his parents look forward with interest to the time when he shall be able to pay his own way. Nothing is more natural than this point of view, for the period of education is long and its cost considerable. But, in endeavoring to turn out graduates who shall be immediately efficient as engineers and capable of earning good salaries, there is danger of encroaching too much on that portion of the four years which should be devoted to a sound training in those subjects which underlie all engineering, developing the student's thinking faculties and teaching him how to apply engineering principles to the solution of practical problems. Mine man-

agers and others who employ young graduates have in a measure helped to bring about this condition by expecting too much from the four years of school training. Though many graduates actually do meet the requirements in a surprisingly efficient manner, the early failures are numerous enough to attract attention and arouse criticism.

THE PERSONAL EQUATION

The young men entering the schools, though of all sorts and kinds in their physical and mental capabilities, are driven through the course of study at the same speed and supplied with the same routine of work. Even if it were possible so to vary the system of training as to adapt it to each individual case, there would still be some failures. A uniform product cannot be expected from heterogeneous raw material. The exceptional men, who are naturally able and well balanced and endowed with the talent of common sense, may make good from the hour of their entrance into the field. Others, by assuming too soon positions of responsibility, attain success only through experience born of early failure. Still others, slower in their development, advance steadily after graduation, gaining experience in subordinate positions, learning to manage men, and so achieve substantial progress by the time they have been out of school a few years.

There are also the "round pegs in the square holes"—young men who are unfitted for any engineering profession and who, long before graduation, should have been directed into a more suitable career.

H. D. McCASKEY INSPECTS WESTERN OFFICES OF GEOLOGICAL SURVEY

In all probability the Western mineral resources reports will be more complete and submitted more promptly than before, as a result of suggestions made by H. D. McCaskey, chief of the Mineral Resources Division of the United States Geological Survey, on a recent inspection trip to the Western offices of the Survey.

Mr. McCaskey was forced to hurry back to Washington in order to complete some reports for which the matter became available earlier than was expected, and as a consequence he missed the American Mining Congress convention and the meetings of the other technical societies in San Francisco, which he expected to attend.

He visited with the heads of the three western offices of the Survey at Denver, Salt Lake City and San Francisco. He found the work progressing normally, with prospects good for an unusually successful year. He was impressed by the interesting way in which the mining exhibits are displayed at the fair.

MINING ENGINEERS TO FORM PROMINENT PART OF RESERVE CORPS

**Nation-wide Movement Inaugurated to Supplement Engineer Corps of Army in
Case of War—Plan Meeting with General Approval—Prominent Engineer
Tells What It Is Expected to Accomplish**

Mining engineers are going to fill an important place in the United States Reserve Corps of Engineers. The developments of the war in Europe bring out the fact that the mining engineer is fitted by training and experience to be of greatest service.

In addition to looking after the systematic and well-regulated supply of the numerous products of mines which are used in war, mining engineers are particularly well equipped to direct excavations of trenches and the running of tunnels. The average mining engineer is an expert on the use of concrete in construction, and could be utilized for road and railroad building, construction of bridges and the thousand and one activities in war which call for trained workers.

Dr. Henry S. Drinker, President of Lehigh University, is taking an active part in the movement. He is directing the effort to insure the cooperation of the nation's mining engineers.

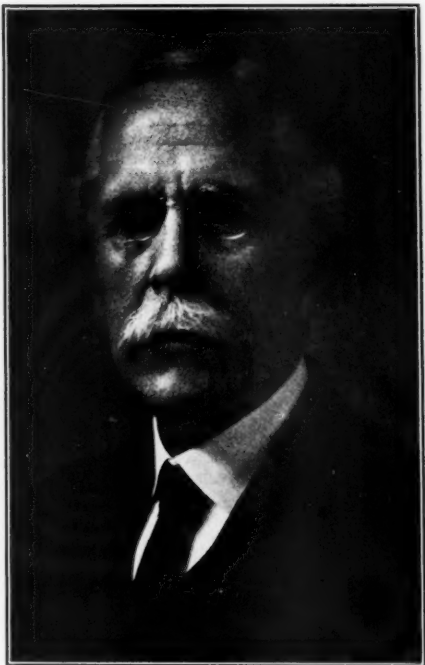
DESCRIBES PROJECT

A prominent engineer who recently discussed the reserve corps said:

"There are today in the United States Army about 250 engineer officers, who constitute a body of men as efficient as there is to be found in any army in the world. As a matter of fact, man for man, the Corps of Engineers of the Regular Army stands head and shoulders above any similar body of men in any army in the world. I say this without reservation.

"But these men would be but a handful to the number of engineers that would be needed if our country were called upon to fight a war. In a time of war the number of engineers who would be needed, and needed immediately, would be a great many times 250. Fortunately, the engineers are here, but up to the present time their organization into an efficient reserve corps has not been attempted. This is proved by the fact that there are probably more than 25,000 splendidly efficient men in the engineering professions of this country at the present moment.

"To revert to the possibility of war—which I, like all other good citizens, hope is remote—in such an event there would be work that must be immediately undertaken that would necessitate the services of thousands of our best engineers. It is in order to have these men ready to answer the call of the Government at a moment's notice that the present corps is being organized.



HENRY L. DRINKER, E.M., LL.D.

President of Lehigh University, who is marshalling the nation's mining engineers into an efficient reserve corps.

BIG PROBLEMS IN CASE OF WAR

"If war did come to us, among the first problems that would face the War Department would be those of fortifications, transportation, sanitation, water supply, inspection and development of materials, particularly ordnance and the manufacture of munitions, bridge building, automobile organization, aerial work, harbor protection (other than that afforded by the fortifications proper), the equipment for military purposes of our railroads, problems involving tunneling, the design and manufacture of engine and other equipment for our services, the manufacture

and development of high explosives, and hundreds of other things that would have to be done without delay for the better protection of our country.

"The fact that these things would have to be done, and done quickly, suggested the idea of which the proposed Corps of Reserve Engineers is the outcome. The various societies met and it was unanimously decided to place at the command and call of the Government a selected, qualified, and efficient body of engineers of varied experiences.

WOULD BE REAL RESERVE

"The corps will not be a paper corps. It will be one the services of whose members are always available. As nearly as it is possible, we hope to make it an actual active reserve of the army, whose members will study and keep in touch with the problems of national defense with which the engineer arm has most to do, who will at regular intervals go into the field for actual practice and training.

"For instance, suppose that the Government needed some information as to railroads, bridges, highways, or needed other information for strategical purposes outside of our own country. Would it not be a comparatively easy matter to intrust the getting of that information to a capable, loyal civilian engineer rather than to an officer of the Army or Navy, who would in practically nearly every instance be known to one or more officers of every other army or navy in the world? That's just a question that you can answer for yourself.

"The problem of organization, which I think I can assure you will be successfully worked out, is how to make a body of men in civil life practically a part of the Army of the United States. The answer to that question will probably be ready for publication in a very short time.

MUST HAVE ABILITY

"It should also be pointed out that it is not going to be a mere matter of application and approval to get into this corps. Every man who becomes a member of the Reserve Engineer Corps will have to fill the bill as to ability, character, and efficiency."

SYSTEMATIZE ADMINISTRATION OF WORKMEN'S COMPENSATION

That State commissioners having charge of the administration of workmen's compensation acts are developing their work along more systematic lines is indicated by the inquiries being received at different Government offices here.

These commissioners seem to be particularly anxious to have more detailed information in regard to mine accident statistics.

Most of the State commissioners are classifying their accidents as follows: Permanent, partial permanent, over fourteen days, one to fourteen days, and no time lost.

GEOLOGICAL SURVEY MAPS NOW OBTAINABLE FROM POSTMASTERS

The finest and most accurate maps of the United States are those made by the United States Geological Survey. This branch of the Government service prints more than 3,000 maps a day, or about a million a year, most of which are sold to the public directly from Washington. Book and stationery concerns in the larger cities, of course, handle these maps, but heretofore there has been no way in which the inhabitants of the small towns throughout the country could get them except by sending to Washington. Now, however, postmasters in towns and villages have the permission of the Postoffice Department to handle these maps. When the Geological Survey prints a new map it sends a sample copy to the postmasters in the area covered, with the suggestion that they tack it up in a conspicuous place, where everyone calling for mail can see it, and order a small stock for sale to those who wish to buy the map. This saves the purchaser the annoyance of sending to the Geological Survey and waiting until the map is received from Washington and also saves the expense of postage. The postmaster himself receives a small commission on each map sold.

Many active postmasters are handling the maps, and that their fellow citizens appreciate the accommodation of being able to buy Government maps at the postoffice is shown by the number sold in this way. The record of maps so sold shows that a postmaster in Minnesota heads the list so far, having sold 125 maps the first month he handled them.

Only postmasters in regions that have been recently mapped have been asked to handle the maps, but the Geological Survey willingly answers inquiries made by other postmasters, sending them a sample copy of the map that covers their district, if it has been mapped.

It is believed that this new plan of distributing the Government maps will benefit all concerned; it will be a convenience to the purchasers, it will bring the postmasters a small commission, and it will increase the sale of the maps.

REPORT ON OIL FIELDS IN SOUTHERN APPALACHIANS BEGUN

E. W. Shaw, of the Geological Survey, has begun work on an extensive report covering the southern Appalachian oil and gas fields. This report was started by M. J. Munn, when he was connected with the Geological Survey. Mr. Munn is now consulting geologist for the Gulf Pipe Line Co.

Mr. Shaw finds that it will be necessary to do considerable more field work in order to secure sufficient data to complete the report. This will require at least a year. Consequently it will be at least two years before the completion of the report.

CHINO COPPER CO. MAKES NEW RECORD AT ITS MILL

The total tonnage of ore treated for the three months ending June 30 by the Chino Copper Co., was 592,200, being an average of 6,507 tons per day. This is the highest average tonnage treated by the mill since the beginning of operations, the daily average for June being at the rate of 7,317 tons. The average content of the tonnage treated for this quarter was equivalent to 2.38 per cent. copper. For the first quarter of 1915 there were treated 406,000 tons of ore, being an average of 4,511 tons per day, containing an average of 2.19 per cent. copper. The average extraction for the second quarter of 1915 was 65.34 per cent., corresponding to a recovery of 31.16 pounds of copper per ton of ore milled. The average extraction for the previous quarter was 66.12 per cent., corresponding to a recovery of 28.90 pounds of copper per ton of ore milled. There were produced 41,735 dry tons of concentrates averaging 22.11 per cent. copper, as against 21,401 dry tons of concentrates averaging 27.41 per cent. copper for the previous quarter. The ratio of concentration for this quarter was 14.19 tons into 1 as against 18.97 tons into 1 for the first quarter of 1915, this decrease being due to the fact that the ore treated during the quarter was not of as good concentrating grade as that handled in the previous quarter.

The cost per pound of copper produced for the quarter, after allowing for smelter deductions and crediting all miscellaneous income, was 6.10 cents, as compared with 6.38 cents for the first quarter of 1915. These costs include, as usual, all operation, administration and general charges, and the regular charge of 30 cents per ton of ore treated for the extinguishment of mine development and stripping expense.

VAN H. MANNING APPOINTED ON ANACONDA COMMISSION

Van H. Manning, director of the Bureau of Mines, has been appointed by the Attorney General as a member of the Board of Experts to investigate and report regarding the operations of the smelter of the Anaconda Copper Mining Co., of Anaconda, Mont.

Mr. Manning is the representative of the Government on this board. He fills the place made vacant by the death of Dr. Joseph A. Holmes. Other members of the committee are John Hayes Hammond and Louis D. Rickitts.

Dr. White in San Francisco

Dr. David White, chief geologist of the Geological Survey, is in San Francisco, after an inspection trip over the Denver & Rio Grande Railway.

He also visited Gerlach, Nev., where he looked over the drilling operations, undertaken in an effort to find deposits of potash or nitrates.

INFORMATION REGARDING PLACER MINES IS BEING ASSEMBLED

**Will be Collected and Published in one Book
—Much New Matter is Being
Gathered**

Cooperating with the Bureau of Mines, the United States Geological Survey is preparing a complete report upon placer mining in the United States. Scattered through survey literature and other mining publications, a great deal of information in regard to American placers can be found. Owing to the difficulty in searching out this information, however, it has been decided to issue one volume, reviewing such matter as has been published, and bringing up to date all available information in regard to placer mining.

In order to obtain a comprehensive preliminary knowledge of the present status of the placer industry in all parts of the country, cards are being issued to all operators. It is requested that they furnish the following information:

Name of mine; name of owner, operator, location and accessibility; date of discovery; period of greatest activity; total production mined; character of deposits; character of gold available; value per yard; how worked; amount of gravel handled; amount of water used; length of ditch; operating costs, and some general information, in regard to the name of lode mines in the vicinity, the deposits of gold with reference to old channels, origin of the gold, description of gold saving plant, description of cross section of deposits from surface to bed rock, and information as to other valuable minerals found.

As this work promises to be of important aid to miners, the director of the Survey urges that all operators be prompt in replying to these cards.

Compiling Service Bulletin

The Bureau of Mines is compiling a service bulletin which will contain the name, address and telephone number of each member of the staff. In addition, the names will be classified in the divisions in which they are working.

Refund on Lead Ores

Reparation has been ordered paid to the Robert Fluorspar & Lead Co. by The Illinois Central Ry. The refund covers unreasonable charges collected upon lead ore from Marion, Ky., to Carnegie, Pa.

Has Big Lignite Resources

It has been estimated by the Geological Survey that the State of North Dakota contains the enormous amount of 697,000,000,000 short tons of lignite in beds over three feet thick, within a thousand feet of the surface.

IMPORTANT OBSERVATIONS MADE IN SILVER MINES IN COLORADO AND OTHER STATES

Comprehensive Study of Silver Enrichment Under Way—Dr. Edson S. Bastin Visits Monte Christo Mine, Famous for its Native Silver, and Other Notable Properties Including the Comstock at Virginia City

Since the pioneer work of J. F. Emmons, at Leadville, and of Walter Harvey Weed at Neihart, Mont., it has been recognized by geologists that many silver ores owed their richness to a process known as "secondary enrichment" or more properly "downward enrichment."

Briefly, this process consists in a reworking of the original or primary ore, through the agency of surface waters entering the ore body. These waters dissolve silver from the oxidized surface portions of the lode and re-deposit it farther down in the form of native silver or of various silver compounds.

Largely because of the great decline in the price of silver, the attention of mining men and geologists has been turned more to the study of the ores of other metals, and such fragmentary information as has been gleaned in regard to silver enrichment has been incidental to the exploitation and study of other metals.

BASTIN ASSIGNED TO WORK

Two years ago, however, the Geological Survey decided to undertake a special field and laboratory study of the process of silver enrichment and Dr. Edson S. Bastin was assigned to the work, his previous study of the ores of Gilpin County, Colo., having given him an interest in the problems involved. In the chemical side of the work, he has the cooperation of Dr. Chase Palmer, well known for his work in chemical mineralogy.

In the course of the first year's field work, the silver mines of Lake City, Ouray, Telluride, Rico and Dunton, in Colorado, were visited and during the present field season, the Patagonia, Wickenburg and Kingman regions in Arizona, and Tonopah and Virginia City in Nevada, were visited.

The ore of the Monte Christo mine near Wickenburg is probably the richest native silver ore now being mined in the United States, and the study of the rich specimens collected should prove of unusual interest.

SPENDS MONTH AT TONOPAH

At the rich camp at Tonopah, Nev., over a month was spent in the mines, and three months already have been spent by Dr. Bastin in cooperation with F. B. Laney, of the U. S. Bureau of Mines in painstaking microscopic study of its ores.

The famous Comstock Lode at Virginia City, Nev., which is credited with a production of nearly half a billion dollars, is now only a shadow of its former self, but while little could be learned from underground study in the few workings now open, microscopic study of samples from the old bonanzas may yield valuable information.

The hot workings of the Comstock are not pleasant places to linger in even for a geologist devotee of volcanic rocks. The temperature of the mine water at one place where it was measured by Dr. Bastin, was 149° Fahr.

The determination of the extent to which the silver minerals of a particular mining camp are primary or secondary is of great practical importance inasmuch as ores, which are primary, are likely to be relatively persistent in depth, while those which are secondary will play out or at least decrease in value with depth.

The result of this work will be published as short papers in each district, as its study is completed. The whole series eventually will be assembled in a comprehensive Survey report.

BRITISH COLUMBIA AGREES TO COOPERATIVE AGREEMENT

Cooperation has been agreed upon by the United States Bureau of Mines and the Department of Mines of British Columbia. The following letter from the Minister of Mines has been received by Van H. Manning, director of the Bureau of Mines:

"I have the honor to acknowledge the receipt of your letter of the 11th instant, stating that the Bureau of Mines will be pleased to cooperate with the Department of Mines in British Columbia in the matter of issuing certificates of mine rescue training to holders of similar certificates issued by our department, upon the applicant taking a two-hour test wearing apparatus, and satisfying the examiner that he is entitled to such certificate, and vice versa on our part with applicants who are holders of certificates issued by the Bureau of Mines of the United States.

"The department desires to express its appreciation of this further proof of the broad, liberal policy which has always been prominent in the work of the Bureau of Mines.

"A copy of your letter will be sent to the instructors in our Rescue Stations."

Traffic Developments of the Month

COMPLAINT DISMISSED

Carrier Not Held When It Delays Installation of Promised Side Tracks

The complaint filed by the Picher Lead Company of Joplin, Mo., against the San Francisco Railway, for failure to extend side tracks, has been dismissed.

In discussing this case, Commissioner Clements said: "The complainant alleges that demurrage charges in the sum of \$615 on certain carloads of coke were unlawfully assessed, and reparation is asked in that sum.

"In December, 1912, the complainant, finding that the tracks connecting its plant with the defendant's main line were inadequate for the proper receipt and unloading of coke, which commodity the complainant uses in large quantities, made application to the defendant for the construction of a 60-foot extension to one of complainant's unloading tracks. The defendant agreed, rather informally, to make the extension promptly, but although the physical work involved could have been completed in three or four days, the track was not actually completed for more than a year. The complainant operates under an average demurrage agreement with the defendant, and states that the excess of debits over credits which accrued during the period in question would not have resulted had the extension been promptly built.

"There are five spur tracks running into complainant's plant, averaging from 100 to 150 yards in length. Parts of four of these spurs can be used in placing cars for unloading. On one of them there was room for two cars, on another six, on another four, and on still another six. The spur to which the extension was to be added is over 100 yards long, but only the end of it is used for unloading coke.

"In the spring of 1913 the complainant, relying on the defendant's promise to extend the coke spur, placed orders for its yearly supply of coke, to be delivered in installments. It is stated that because of defendant's failure to make the extension promptly the shipments could not be expeditiously handled when they arrived and that the demurrage charges were due to the defendant's breach of contract. While in the complaint the delay in unloading is attributed only to defendant's failure to fulfill its alleged contract, there was also some evidence presented at the hearing to the effect that a small portion of the track was torn up when several cars were run off the end thereof, and that the complainant's inability to unload the cars promptly was due in part to that fact; but it is wholly insufficient to support a finding that detention of the cars involved was due to this. Furthermore, it does not clearly appear that the detention of cars resulting in accrual

of the charges in question was unavoidable, for there were other points in complainant's yards where it was physically possible to unload coke cars, although they were used for other purposes.

"The so-called contract for the track extension was of an informal character, and appears to have been only a promise to comply with complainant's request therefor. Even had it been a formal written contract, the question of alleged damages resulting from its nonfulfillment would be one for determination by the courts, and not by this Commission; therefore what is here said is not to be construed as implying that we would reach any different conclusion in this case if a formal contract had been entered into.

"Upon consideration of all the evidence of record we are of opinion and find that the charges in question are not shown to have been improperly assessed."

Pyrite Rate Excessive

Reparation has been allowed by the Commissioner in the case of the La Follette Iron Co., against the Southern Ry. Co. A refund of \$238.39 was ordered on account of unreasonable charges on sixty-four car loads of pyrites from Athens, Ga., to La Follette, Tenn.

St. Louis Hearings

Hearings have been assigned in St. Louis for October 17 and November 1. On the former date, I. & S. 395, which deals with coal rates from Illinois mines, will be discussed before Examiner Bell.

The hearing of November 1 deals with complaint 6,128, which is that of the Vulcan Coal & Mining Co. v. Illinois Central. This hearing originally was assigned for October 1, but was postponed.

Attack Mining Machinery Rates

Rates on mining machinery from Milwaukee to Ironwood, Minn., and Bessemer, Mich., have been attacked by the Newport Mining Co. of Milwaukee in the complaint against the Chicago & Northwestern Ry., which has been filed with the Commission.

Rehearing Denied

A rehearing in the matter of coal rates from Illinois mines to Omaha and other points, which was filed by the Southern Coal, Coke & Mining Co., has been denied by the Commission.

Complaint Dismissed

At the request of the complainant the case of the Dilltown Smokeless Coal Co. v. Buffalo, Rochester & Pittsburgh Ry. has been dismissed by the Commissioner.

UPHOLDS RAILROAD**Commission Says Carrier Is Justified in Refusing Coal Storage at Perth Amboy**

In the case of the Plymouth Coal Co. v. Lehigh Valley Ry. Co. the Commission finds that the defendant was justified in its refusal to continue to furnish storage bins at Perth Amboy, N. J., for the free storage of anthracite coal.

The defendant's demurrage regulations concerning anthracite coal for shipment at tide-water, at Perth Amboy, N. J., were found to be reasonable.

To Discuss Iron Ore Rates

A hearing in the matter of rates on iron ore from Lake Erie to points in Ohio, West Virginia and Pennsylvania has been assigned for October 18. The hearing will be conducted in Pittsburgh.

Plymouth Company Gets Reparation

Reparation has been granted the Plymouth Coal Co. in its case against the Lehigh Railway.

The Commission found that the rates charged for transportation of anthracite coal from Luzerne, Pa., to Perth Amboy, N. J., for transshipment were unreasonable.

Ordered to Pay Drayage

The Central Railroad of New Jersey has been ordered to pay drayage incurred on a shipment of ferro-manganese from Rockaway, N. J., to Reading, Pa. The complaint was filed by Crockett Bros.

FAIL TO FATHOM OBJECT OF FRENCH EMBARGO ON PLATINUM**Government's Experts Believe Present High Prices of Tungsten Are Very Unstable—British Move Checks Mining**

Experts here are at a loss to understand why an embargo has been placed upon platinum by France. Substitutes for this high-priced metal have been found for practically every use in military appliances.

Tungsten is being used almost entirely for the points of auto sparkplugs. Electric contacts are being made with tungsten instead of platinum. Even in electrical furnaces, platinum resistance wires are no longer being used to a great extent. This information is from one of the best authorities in the Government service.

The embargo on platinum is expected to stimulate a search for additional deposits of this metal in the United States.

There are increasing uses for platinum being found each year and the demand for the metal is not expected to decrease greatly, owing to its substitution in electrical and other uses.

Nichrome is being used largely for the resistance wires on small electric furnaces, instead of platinum, which formerly was used exclusively. Nichrome is very much superior to platinum for this purpose. Tests were made upon a small optical furnace in this city lately. It was found it is necessary to wrap the furnace from four to twelve times a year with platinum wire, while the use of nichrome wire made re-wrapping necessary only once each six months.

Tungsten continues to soar. It is the advice of the Government's geologists that miners having any tungsten ores bend every effort to mine them and get them to market quickly. Present prices are regarded as being very unstable.

There is a possibility that production will be so stimulated that the price may fall, even if the war should continue indefinitely. Certainly with the first real talk of peace, the price of the metal will tumble.

Every projectile being manufactured is turned with tools containing from 16 to 20 per cent of tungsten. It also is entering into the composition of various steels now in great demand.

Much interest was excited here by Great Britain's action in commandeering all tungsten ore in the United Kingdom. By fixing the price at 55s. per unit, the British government has taken away much incentive for mining tungsten ore within its own territory.

Tungsten ore has been sold in this country for double the price fixed by the English authorities.

Great Britain has designated H. A. Watson & Co., of Liverpool, as the only firm allowed to make purchases of tungsten ore.

Tungsten mining in Burma has been discouraged also by local legislation, it is reported. Laws recently enacted in that British possession are described as highly discouraging to mining operations. They already have resulted in considerable curtailment of mining operations.

SALT LAKE CITY MINERS**HONOR PRESIDENT SCHOLZ**

Carl Scholz, president of The American Mining Congress, and party, who left Chicago in a private car September 16, en route to the eighteenth annual convention of the American Mining Congress at San Francisco, stopped for a few hours in Salt Lake City, where they were met by the board of directors of the Utah Chapter. The officials of the Utah Chapter had planned extensive entertainment for Mr. Scholz and his party, but as their stay was curtailed on account of a railroad accident, which caused them to reach Salt Lake City several hours late, the original plan was abandoned. A reception, however, was held at the Hotel Utah, and the party was taken for an automobile drive about the city. G. A. Mackenzie, secretary of the Utah Chapter, left with Mr. Scholz's party to attend the convention.

Recent Legal Decisions

FAILURE TO SUPPLY CARS

A railroad company doing business as an interstate carrier is liable for damages caused by its failure to furnish a coal miner and operator with cars in which to load coal for shipment to points within and without the State, where it is charged that the railroad company unjustly discriminated against the coal operator in failing to distribute cars in accordance with its own rule applicable in times of shortage. The act to regulate commerce (24 U. S. Statutes at Large, 379; 34 U. S. Statutes at Large, 584), does not give shippers any new right but preserves existing causes of action and does not supersede the jurisdiction of State courts in any case where the decision does not involve the determination of matters calling for the exercise of the administrative power and discretion of the Interstate Commerce Commission, or relate to a subject as to which the jurisdiction of the Federal courts has otherwise been made exclusive; and in actions against railroad companies for unjust discrimination in interstate commerce where the rule of distribution itself is attacked as unfair or discriminatory, a question is raised which calls for the exercise of the authority of the Interstate Commerce Commission; but if the action is based upon a violation or discriminatory enforcement of the carrier's own rule for car distribution, no administrative question is involved, and such an action, although brought against an interstate carrier for damages, arising in interstate commerce, may be prosecuted either in a State or the Federal court and the action may be based either on the common law rule or on a State statute.

Illinois Central R. R. Co. v. Mulberry Hill Coal Co., 238 U. S. 275, p. 282, June, 1915. See *Pennsylvania R. R. Co. v. Puritan Coal Mining Co.*, 237 U. S., 121, p. 127, April, 1915.

BROKER'S COMMISSION

Where an agent or broker is employed by the owner of mining property to secure a purchaser and the agent brings to the owner a purchaser for such mining property, and the owner enters into a contract of his own making with the purchaser so furnished, the owner thereby accepts the purchaser so found by the broker, and the broker's commission is then due, although it may afterwards turn out that the customer was not financially able to buy.

Knisely v. Leathe (Missouri), 178 Southwestern, 453, p. 459, June, 1915.

EXPERT EVIDENCE

In an action by an injured miner for damages and in controversies over mining prop-

erty, the conditions may be such that experts will be allowed to give expert testimony by way of opinion because they are presumed to have acquired peculiar skill and knowledge and are more capable of forming a correct opinion as to the subject matter of the question under discussion than inexperienced persons, and their opinions are admitted in evidence for the purpose of aiding the jury in understanding questions which inexperienced persons are not likely to decide correctly without such assistance; but the testimony of such experts may receive only such consideration by the jury as the testimony may appear to the jury to deserve.

American Bauxite Co. v. Dunn (Arkansas), 178 Southwestern, 934, p. 936, July, 1915.

EFFECT OF INTOXICATION

The mere fact that a miner was intoxicated at the time he received an injury does not of itself show contributory negligence as will defeat his recovery in damages for the injury, but it is a circumstance to be considered in determining whether or not his intoxication contributed to the injury.

American Bauxite Co. v. Dunn (Arkansas), 178 Southwestern, 934, p. 935, July, 1915.

WRONGFUL DEATH OF MINER

In an action for the wrongful death of a miner under the provisions of the statute of Arizona giving a right of action for injuries resulting in death, where there is no averment in the complaint as to whether or not the deceased miner had elected to accept compensation under the provisions of the workmen's compulsory compensation act of Arizona, the fact of such election is a defensive matter and if not raised by a plea or answer it is waived by the defendant, the mine operator.

Behringer v. Inspiration Consolidated Copper Co. (Arizona), 149 Pacific, 1065, July, 1915.

LOCATION NOTICE

The object and function of a location notice does not extend to conferring full title to mining properties, and it differs from ordinary documentary muniments of title in that it is not title nor proof of title, nor does it constitute, nor of itself establish, the possessory right in issue and to which it relates; but it is purely a creature of statute and when duly recorded becomes notice to the world of the facts therein set forth, the description of the premises claimed and by whom claimed, and to secure the discoverer or locator against others seeking to locate the same ground, and is constructive notice of the locator's possession. The statute seems also to make it one

of the steps requisite to make it a perfected mining location, and the notice is sufficient if it contains all the matters required by the local statute and was recorded within ninety days after the commencement of the location.

Copper Queen Consolidated Mining Co. v. Stratton. (Arizona) 149 Pacific 389.

DEFECTIVE LOCATION NOTICE

A location notice that is defective because it fails to contain the required statutory recital is not void, but voidable only, and is, under the Arizona statute, subject to amendment, and after amendment the original location notice and the amended notice are admissible in evidence in a controversy over the mining location.

Copper Queen Consolidated Mining Co. v. Stratton. (Arizona) 149 Pacific 389.

APPROPRIATION OF LAND

The validity of statutes for the appropriation of private property for mining purposes may sometimes depend upon many different facts, the existence of which would make a public use, even by an individual where in the absence of such facts the use would be clearly private, but such facts must be general, notorious and acknowledged in the State and are not the subject of judicial investigation, but are well known by the courts; and the courts in the construction of such statutes will notice the situation and conditions leading to the demand for the enactment of such statutes and in their construction may consider the results upon the growth and prosperity of a State which in all probability would flow from a denial of the validity of such statutes, and all such matters may have a material bearing upon the question whether the individual use proposed is not in fact a public use. But for the existence and validity of such statutes, the owners of mines and of works for the reduction of ores, the operations of which furnish thousands of men in the State with employment at good wages, and to which the general prosperity of the State is largely due, would be denied the right to invoke such statutes when necessary to the successful operation of their business, or for acquiring rights of way for the transportation of ores from the mines to the mills and smelters, or for the construction of tunnels for drains, or for necessary lands for the deposit of tailings; and parties holding title to ground necessary and suitable for these purposes, which might be entirely worthless except for such purposes, would be clothed with power to demand and compel payment of unconscionable prices for their lands before parting with the title, or they could refuse absolutely to grant the easement required on any terms, and thereby cripple mining enterprises or destroy them altogether. Courts may know that such a policy would not only be inconsistent and unreasonable, but would greatly retard the development of one of the greatest natural resources of the State; and in consideration of such facts, persons and corporations owning and operating mines and mills for the reduction of ores may under

such statutes condemn land for obtaining water for mining purposes, the construction of rights of way for tunnels, flumes and dumping places for tailings, where the statute makes ample provision for the payment of a fair price to the owner of lands sought to be condemned as well as for all damages that he may suffer because of the appropriation and use.

Goldfield Consolidated Milling, etc., Co. v. Old Sandstrom Annex Gold Min. Co. (Nevada), 150 Pacific, 313, p. 316, July, 1915.

Clark v. Nash, 198 U. S. 361, 25 S. Ct. 676.

Strickley v. Highland Boy Gold Min. Co., 200 U. S. 527, 26 S. Ct. 301.

Highland Boy Gold Min. Co. v. Strickley, 28 Utah 215, 78 Pacific 296, 107 Am. St. 711, 1 L. R. A. (N. S.) 976.

DEPOSIT OF TAILINGS

A mining corporation engaged in milling and the reduction of ores, depositing the tailings from the treatment of its ores upon a portion of its own land lying in a gulch, and there conserved the same for the purpose of retreatment, but where by reason of high waters and floods, large parts of such tailings were washed down upon the land of an adjoining owner, has the right under the statute of Nevada (Revised Laws, Sections 2456, 2458 and 5606) to condemn the land or a sufficient part thereof for a right of way for a tramway for the purpose of erecting a tram thereon to reconvey such tailings to its mill, and the common law rule to the effect that a structure erected by a tortfeasor upon the lands of another becomes a part of the land does not apply.

Goldfield Consolidated Milling, etc., Co. v. Old Sandstrom Annex Gold Min. Co. (Nevada), 150 Pacific 313, p. 317, July, 1915.

NECESSITY OF CONDEMNATION

In a proceeding by a corporation operating a mill for the reduction of ores to condemn lands for the deposit of its tailings the law does not require that an absolute necessity should exist for the identical lands sought to be condemned, but it is sufficient if the lands sought to be used will be of great benefit and advantage to the mining industry of the particular community; that it is necessary to condemn such lands for the protection and advancement of these interests, and that the benefits arising therefrom are of paramount importance as compared with the individual loss or inconvenience to the owner of the land; and generally under such circumstances the discretion of the corporation in the selection of land for its use will not be questioned where it acts in good faith and not capriciously.

Goldfield Consolidated Milling, etc., Co. v. Old Sandstrom Annex Gold Min. Co. (Nevada), 150 Pacific 313, p. 318, July, 1915.

APPROPRIATION OF SURFACE

The fact that a tract of land sought to be appropriated for deposit of tailings by a mining corporation operating a mill and re-

duction works is a patented mining claim will not defeat the proceedings for appropriation where it appears that the claim was not in fact being worked and had not been worked for several years, and the mere possibility that the land may some time in the future be used by the owner for mining purposes will not prevent condemnation of a right of way for a tramway, and especially where the use for which the condemnation is sought will not interfere with the operation of the land as a mining claim.

Goldfield Consolidated Milling, etc., Co. v. Old Sandstrum Annex Gold Min. Co. (Nevada), 150 Pacific 313, p. 319, July, 1915.

LAND APPROPRIATED

The statute of Nevada provides for the right of eminent domain for certain public uses and provides also for the appropriation of the fee of land, but the statute does not say that the fee simple shall be taken, but only that it is subject to be taken, and in condemnation proceedings only such an interest as is necessary can be taken.

Goldfield Consolidated Milling, etc., Co. v. Old Sandstrum Annex Gold Min. Co. (Nevada), 150 Pacific 313, p. 319, July, 1915.

EXEMPTIONS FROM TAXATION

Article 10, Section 1, of the Constitution of Nevada, as originally adopted, exempted all mines from taxation, but this section was amended so as to permit assessments for taxation of all patented mining claims, but any patented mining claim upon which \$100 worth of work is annually done is made exempt from taxation, and the purpose of this change was to stimulate mining.

Goldfield Consolidated Milling, etc., Co. v. Old Sandstrum Annex Gold Min. Co. (Nevada), 150 Pacific 313, p. 316, July, 1915.

DECLARED A PUBLIC USE

By Section 2456 of the Revised Statutes of Nevada, mining for gold, silver, copper, lead, cinnabar and other valuable minerals is recognized as the paramount interest of the State and is declared to be a public use.

Goldfield Consolidated Milling, etc., Co. v. Old Sandstrum Annex Gold Min. Co. (Nevada), 150 Pacific 313, p. 316, July, 1915.

OWNERSHIP OF TAILINGS

A corporation engaged in milling and the reduction of ores deposited the tailings therefrom upon a portion of its own land lying in a gulch through which water flows at times in great volumes and with great force, and, notwithstanding all reasonable efforts by dams and otherwise to retain its tailings, the tailings eventually were forced upon the lands of an adjoining owner. These tailings were valuable and their retreatment, intended by the mill owner, profitable, and the fact that the tailings were so washed down upon the lands of an adjoining owner and permitted to accumulate and remain for some considerable time is not sufficient to show an abandonment

on the part of the owner of the tailings where it is clear that the owner had no intention of so doing, but, on the contrary, always intended to conserve and retreat the tailings.

Goldfield Consolidated Milling, etc., Co. v. Old Sandstrum Annex Gold Min. Co. (Nevada), 150 Pacific 313, p. 317, July, 1915.

LAND FOR TAILINGS

The statute of Nevada, Section 5606, Revised Statutes, provides that the right of eminent domain may be exercised in behalf of such public uses as tunnels, ditches, flumes, pipes and dumping places to facilitate the milling and smelting or reduction of ores, or the working of mines, and for all mining purposes as well as for outlets, natural or otherwise, for the deposit or conduct of tailings, refuse or water from mills, smelters or other works for the production of ores, or from mines, mill dams, natural gas or oil pipe lines, tanks or reservoirs (Statutes of 1907, p. 279), and under this section, together with Sections 2456 and 2458, a corporation engaged in mining and milling and reducing by other methods gold, silver and other ores has the right to condemn land for the deposit of the tailings from its mills.

Goldfield Consolidated Milling, etc., Co. v. Old Sandstrum Annex Gold Min. Co. (Nevada), 150 Pacific 313, p. 316, July, 1915.

NOT DUE TO WAR

Arizona Man Says Copper Prices Will Slump Before Long

"Most of the increased demand for copper and other metals seems to be for domestic consumption rather than because of the European war." This unusual view of the situation was taken by S. A. McLane, a mining man of Phoenix, Ariz., who was in Washington recently. "At the outset of the war the price of copper took a tumble and many of the mines were forced to close, but for several months everybody has been busy. There has been a big demand for skilled labor in the mines, and wages have increased correspondingly. The price of copper has reached a high mark, which, of course, cannot be maintained, nor do the mine owners expect it to be. The peculiar feature of the copper market, however, is that notwithstanding copper is contraband, and the demand abroad not what might be expected, the price rose steadily. There is no doubt that much copper is finding its way to Europe, but sales registered abroad would not warrant the increase in the price.

"Business is getting better everywhere," continued Mr. McLane. "Business men and the public appear to be optimistic, and manufacturers are getting busier every day. In some parts of the West there has been too much rain, which has damaged the crops, but the yield, I believe, will be fully 80 per cent. of normal in those sections where it has rained hardest."

Recent Patents of Interest to Mining

REDUCES HEAT LOSS

Mining Sulphur, No. 1,152,499. This invention is by the late Herman Frasch, of New York, N. Y., and is assigned to the Union Sulphur Co. of Jersey City, N. J.

It relates more particularly to obtaining sulphur by melting it in a natural deposit underground and removing it therefrom in a melted state.

Mr. Frasch stated that the highly heated water introduced as fusion fluid into the deposits of sulphur, flows away underground instead of returning to the surface, and enormous volumes of highly heated water thus introduced into the deposits have been flowing away for a number of years. This water has always carried into the deposits many times as much heat as would suffice to melt the amount of sulphur actually obtained. Notwithstanding the evident accumulation of heat in the ground, the quantity of heat necessary to be sent into the deposit in order to obtain a given amount of sulphur became larger and larger with the progress of exploitation, while the tonnage in a given time with a given plant became less and less.

To overcome this condition, Mr. Frasch found that by a restriction of the fusion fluid, to certain parts of the deposit, and by crowding the fusion fluid upward by water of lower temperature keeping it away from much of the sulphur, and by withdrawing from the deposit water of a temperature below the melting point of sulphur, the fusion fluid could be better distributed in the deposit and could consequently be utilized to better advantage. Mr. Frasch claimed by this process not only to be able to check the increase in the amount of heat required per ton of sulphur produced, but to lower such amount below the average of previous operations, and to attain a higher production per well per day. He further claimed that it is possible, by this method, profitably to obtain sulphur which could not otherwise be obtained profitably, if at all.

PUTS MAGNETS UNDER LOG WASHER

Magnetic Ore-Washer, No. 1,153,037. This invention is by Edward W. Davis, of Minneapolis, Minn.

The object of this invention is to provide an apparatus for separating iron ore from sand or gravel, generally known as "gangue" in which magnetic force or attraction is utilized to cause the adhering together and precipitation of lighter particles of ore which may be mingled with particles of sand or gravel, and which in a gravity separator would be carried out with the tailings of the machine.

Machines of this kind are usually so arranged that the revolving blades stir up the

sand and gravel and cause them to float toward the surface of the water and be carried out with the waste matter. To avoid this Mr. Davis has provided a series of electromagnets beneath the log-washer, which cause the small particles of ore which would usually be washed out with the waste matter to be directed by the magnets and precipitated to the bottom of the troughs. These small particles as they enter the field of magnetic attraction will not only be drawn toward the pole pieces of the magnets but will also adhere, a number of particles uniting to form a larger particle and remaining in this relation while they are in the field of attraction and for a long time after being discharged from the log washer.

ASSIGNED TO METALS RESEARCH CO.

Recovery of Cuprous Sulphide from Ores and the Like, No. 1,151,235. This invention is by Raymond F. Bacon, of Pittsburgh, Pa., and is assigned to the Metals Research Co., of New York, N. Y.

This invention is based upon the discovery that when cupric sulphide is subjected, under suitable conditions, to the action of a hydrocarbon, the result of the reaction is to reduce the cupric sulphide to cuprous sulphide and to bring about a more or less complete union of the available hydrogen and sulphur to form hydrogen sulphide.

Illustrating his invention, Mr. Bacon gives the following example: "The cupric sulphide may be charged into a suitable receiver, which may conveniently have the form and dimensions of an ordinary still, adapted to be heated. If the cupric sulphide charged contains a large quantity of moisture then the containing vessel should have a sufficient capacity to take care of such foaming as is incident to the operation. It is usually preferable to admit the hydrocarbon upon the top of the charge, rather than to mix it therewith, for the reason that by dropping the hydrocarbon upon the top, a quantitative reduction of the cupric sulphide to cuprous sulphide can be effected with a lesser supply of hydrocarbon. It usually will be desirable to employ an amount of hydrocarbon somewhat in excess of that theoretically required for the reaction. It is also feasible to shower the cupric sulphide through an atmosphere of hydrocarbon vapor.

REDUCES SPECIFIC GRAVITY OF ORE

Ore Separating Process, No. 1,151,117. This invention is by Arthur J. Moxham, of Wilmington, Del., and relates to the well-known process of separating solids of different specific gravity, by means of a liquid of relatively high specific gravity.

The invention is designed to reduce the specific gravity of the ore by coating it with

a blanket liquid or other material of specific gravity, substantially lower than that of the separating liquid. In describing his invention Mr. Moxham says: "It has been determined that if certain grades of ore are wet with a large excess of suitable coating liquid and drained for a period of time, it retains a considerable portion of liquid. By reason of the surface attraction between ore and the coating liquid, a portion of this coating will remain in contact with solids."

ASSIGNED TO GRASSELLI COMPANY

Method of treating ores, No. 1,153,203. This invention is by Louis C. Drefhal, of Cleveland, Ohio.

Mr. Drefhal claims to have invented a method of recovering metals, particularly zinc and silver, from ores in furnaces of the type at present in use, without the usual loss incurred, and the inconvenience to the operators.

Mr. Drefhal claims that by mixing the ores or concentrates, or metalliferous materials of the same general physical condition containing sufficient water to render them plastic, the fine particles of the powder are held together. The mass is then made into a granular or lumpy form, to make it possible to desulphurize, calcine or otherwise treat it. It is quite important that the size of the particles be not too large.

This patent has been assigned to the Grasselli Chemical Company, of Cleveland, Ohio.

ASSIGNED TO METALS RESEARCH CO.

Metallurgy of Copper, No. 1,151,236. This invention is by Raymond F. Bacon, of Pittsburgh, Pa., and is assigned to the Metals Research Co., of New York, N. Y.

It relates particularly to the recovery of copper from solutions of copper salts, such as are obtained by the lixiviation of copper ores and furnace residues by means of sulphuric acid, or such as are present in mine waters and the like.

The desired results are obtained by a process wherein hydrogen sulphid is produced by reaction, at a relatively low temperature, between sulphur and a hydrocarbon; by producing elemental sulphur by reaction between sulphur dioxide and a portion of the hydrogen sulphide, and by employing the remaining portion of the hydrogen sulphide for precipitating the copper, as copper sulphide, from the copper salt solution to be treated while regenerating the solution.

SUBDIVIDES COAL

Mining Machine, No. 1,151,383. This invention is by Edward O'Toole, of Gary, W. Va.

The object of this invention is to cut headings or passageways in mines, and when used in coal mines, of which the output is small or is of crushed coal, to subdivide and mine the coal, and thus save the expense of crushing.

Mr. O'Toole claims that this machine may be driven forward as fast as the material in

front of it is cut away. Also that it can be operated so as to remove the material from the entire extent of the opposing material at the end of a passageway, and that it has a self-contained conveying means for carrying away the broken material removed.

FOR PLACER MINING

Ore Separator, No. 1,152,351. This invention is by Charles H. Brown and Charles C. Parker, of Eureka, Utah.

The object of this invention is to provide a device whereby the fine gold in river and beach sands may be efficiently separated from the sand and recovered. The inventors claim to have a device comprising a casing having an air inlet and a material inlet in its upper end and a material outlet in its lower end, a rotatable spreader within the casing beneath the material inlet, a second casing disposed within the first casing beneath the spreader and having openings in its upper and lower ends, the lower end being in proximity to the lower end portion of the outer casing, and a suction device connected with the interior of the second casing.

Other patents granted were:

No. 1,151,234 to Raymond F. Bacon, Pittsburgh, Pa., Recovery of Cuprous Sulphide from Ores and the like; No. 1,151,448, J. M. Draper, Manchester, England, Fine Coal and Ore Separator; No. 1,151,722, Maximilian Schieshel, Frankfort-on-the-Main, Germany, Apparatus for Separating Minerals and Like Materials; No. 1,153,561, O. P. Moore, Spokane, Wash., Oil Burning Smelting Furnace; No. 1,153,700, C. O. Palmer, Cleveland, Ohio, Rotating Device for Rock Drill; No. 1,151,041, C. E. Morgan, Holden Okla., Mine Car Brake; No. 1,154,459, Benigno Viviani, Monessen, Pa., Mining Machine.

ELIMINATES PHOSPHORUS

Method of Treating Tungsten Ores, No. 1,153,594. This invention is by Frederick M. Becket, of Niagara Falls, N. Y., and relates to the treatment of scheelite or similar ores, concentrates, or ores of the calcium-tungstate type.

Mr. Becket states that scheelite and its concentrates often contain considerable phosphorus. It is usually impracticable to eliminate this phosphorus by an acid treatment applied to the raw ore, on account of the loss of tungsten which would be involved.

Mr. Becket finds that by subjecting the ore to a suitable temperature, as, for instance, a red heat, its tungsten-content is rendered nearly insoluble in certain acid reagents, including concentrated sulphuric acid, while the phosphorus remains in a soluble condition. The ore thus purified is smelted under proper conditions, and yields a metal or alloy commercially free from phosphorus. An example of this process is as follows:

The ore, in lumps or ground, is heated for some hours to redness, and after cooling, is mixed to a stiff paste with sulphuric acid, preferably concentrated, suitable proportions being two parts by weight of ore to one part

of acid. The mixture is allowed to stand for some hours, during which time some self-heating occurs. After this has subsided, the residue is washed with water until free from sulphuric acid. By this process the phosphorus is eliminated with practical completeness, without serious loss of tungsten.

VALUE OF OREGON DEPRECIATED LESS THAN CENTURY AGO

New Jersey Senator Ridicules Idea of Making It Part of United States—Predicts as to Future of West

An idea of the tremendous progress made in this country in less than 100 years is obtained from going over old *Congressional Records*. For instance, on February 26, 1825, Senator Dickerson, of New Jersey, made a speech opposing a bill providing for the erection of a fort on Oregon River. Here is an extract from the speech of this man, who doubtless had a reputation in his day for remarkable foresight:

"But is this country of Oregon ever to become a state, a member of the nation? Never. The nation already is too extensive—and we must make three or four new states from the territories already formed."

The Senator then goes into detail to show the enormity of the distance which separates the Capital at Washington from Oregon. He shows how it would take a whole year to make the trip on horseback. The quickest way of making the journey would be around Cape Horn, he pointed out. Then he remarks facetiously, "that probably the better way for an Oregon Senator to reach Washington would be to go around North America by way of Behring Strait. The fact that the passage through the Arctic has not been discovered is of little importance," exclaimed the Senator, "because it will be found long before Oregon becomes a state."

Another observation by this erstwhile sage of New Jersey was that the entrance of Oregon in the Union would weaken the nation and "whenever it acquires the importance of a state it will fall off from the nation by its own weight."

He then asks, "Is this territory to be a colony? Have we a surplus of population we want to send from our country?" Senator Dickerson states eloquently of the millions of acres within the boundaries of the nation that are crying out for tenants. "Why," asks the Senator, "should we send our people to the remote parts of the earth?"

The whole country west of Council Bluffs was declared to be so sterile and so devoid of wood and water as to make absolutely certain the conclusion that it never could be cultivated.

Another orator at the time, gave it as his opinion that the United States would be very glad in centuries to come that this great desert stretched west from Council Bluffs. It would protect the nation from whoever might settle in the wildness of the western mountains.

VALUABLE RECORDS TO HAVE SAFE HOUSING IN NEW BUILDING

Assignments of the space in the new building of the Interior Department have been made.

The Geological Survey will occupy the greater part of the front and middle wing of the new building. The Bureau of Mines also will have some of its offices on the front of the building and in the eastern wing.

For the past thirty years the Survey has been urging the construction of a fireproof building in which its records could be housed. These records are so valuable it is a matter of general surprise that they should have been endangered through all these years in buildings which are veritable fire-traps. Many of the records could not be replaced. They represent much of the work of a high-priced staff during thirty-six years.

A considerable part of the information which is collected by the Survey is not published. It is filed carefully, however, and is constantly referred to in the course of the work. All of the original notebooks of the field men are kept on file and much of the material is referred to frequently. The Bureau of Mines also has voluminous and valuable records which need fireproof protection.

The new building of the Interior Department will be a magnificent structure, built along businesslike and convenient lines, and will have a frontage of 400 feet, with three wings extending back 300 feet. It will be six stories high.

The offices of the director of the Geological Survey will be at the end of the center wing on the fifth floor. The offices of the director of the Bureau of Mines will be at the end of the eastern wing on the second floor.

One of the features of the building will be the room provided for the Geological Survey library. The library will be a single story in height and will jut out from the main building between the center and western wing.

The ceiling will be high and the building will provide for the orderly arrangement of 250,000 volumes on its shelves. In addition there will be ample space left for reading, research and work rooms.

The contract provides for the completion of the building by August, 1916. It is probable, however, that it will be January 1, 1917, before files and furniture can be arranged for occupancy.

FIELD WORK IN IRON DISTRICTS IS COMPLETED

Field work covering the iron districts of Tennessee, northeastern Alabama and northwestern Georgia has been completed by E. F. Burchard. A preliminary report on this work is available for distribution at this time.

Mineral Land Decisions

The Secretary of the Interior has reversed the decision of the Commissioner of the General Land Office in the McKittrick Oil Company case. The McKittrick Company appealed from the Commissioner's decision of March 27, 1914, which directed the institution of adverse proceedings against its mineral entry for the California Oil Company, in Visalia land district, California.

The claim included an area of sixty-four acres. It is said to have been located originally September 19, 1899, and conveyed to the McKittrick Oil Company June 2, 1903.

A second location of ground was conveyed to the oil company by deed July 7, 1903. In December, 1904, the company presented an application for patent to the claim. The application was rejected by the local officers. This action, however, was reversed, and later the local office accepted the application.

PASSED TO PATENT

By decision of August 9, 1913, the Interior Department directed that the entry so allowed be passed to patent if the proofs were found to show satisfactory compliance on the part of the complainant with requirements of the mining laws.

Later a special agent of the Land Office submitted an adverse report upon the claim and the local officers were instructed by the Commissioner to proceed against the entry.

The Land Office charges that the first entry was made for the sole use and benefit of the McKittrick Oil Company, a corporation, through the use and employment, with their full knowledge and consent, of the names of the original locaters, the purpose being such device, fraud and concealment as to secure thereby, unlawfully, a greater area of mineral ground than may be embraced lawfully in a single location by a corporation.

Substantially the same charges were made with respect to the other claim.

COURT FAVORED OIL COMPANY

In the case of *Borgwardt v. McKittrick Oil Company*, the court held, in effect, that the acts charged to the original locaters do not constitute a violation of any of the mining statutes.

The Department is of the opinion that this decision is sound. There is nothing disclosed in the report of the special agent or in any of the affidavits upon which such report is based which established as a result of a hearing and supported the charge that the locations in question were made for the benefit of any person or persons other than the original locaters, all of whom might have joined in the

making of a location without affecting its validity.

While no discovery of minerals within the limits of the claims is alleged to have been made until August 26, 1901, this fact did not effect the patentability of the claims.

In the absence of any reason other than those detailed in the report of the special agent, the Department is of the opinion that the entry should be passed to patent.

MAKERS OF PERMISSIBLE EXPLOSIVES ARE LISTED

Bureau of Mines Takes Steps to Acquaint Miners With Powders They May Use Safely

A list of the manufacturers of permissible explosives just has been published by the Bureau of Mines. The brand names on all explosives now considered to come under the classification of permissible explosive are given. The list is complete up to July 1, 1915, and is as follows:

Aetna Explosives Co., New York; Jefferson Powder Co., Birmingham, Ala.; Cameron Powder Mfg. Co., Emporium, Pa.; Atlas Powder Co., Wilmington, Del.; The King Powder Co., Cincinnati, Ohio; The Burton Powder Co., Pittsburgh, Pa.; High Grade Powder Co., Philadelphia, Pa.; Lowinite Explosives Mfg. Co., Pittsburgh, Pa.; Pennsylvania Trojan Powder Co., Allentown, Pa.; Hercules Powder Co., Wilmington, Del.; Illinois Powder Mfg. Co., St. Louis, Mo.; E. I. duPont de Nemours Powder Co., Wilmington, Del.; G. R. McAbee Powder and Oil Co., Pittsburgh, Pa.; Fort Pitt Powder Co., Pittsburgh, Pa.; Giant Powder Co., Giant, Cal.; W. H. Blumenstein Chemical Works, Pottsville, Pa.; Nitro Powder Co., Kingston, N. Y.

The classes of permissible explosives are described briefly. For instance, to class one, belongs all the explosives in which the characteristic material is ammonium nitrate. The class is divided into two sub-classes. One includes every ammonium-nitrate explosive that contains a sensitizer, that is itself an explosive. The other sub-class, includes every ammonium-nitrate explosive that contains a sensitizer that is not itself an explosive.

When fresh these explosives, properly detonated, have the advantage of producing only small quantities of poisonous and inflammable gases. They are adapted to mines that are not unusually wet, and also for mining and working places that are not well ventilated.

Similar descriptions are given for hydrated explosives, organic nitrate explosives, and nitroglycerin explosives.

PERSONALS

During the absence of Chief Geologist David White and H. D. McCaskey, the head of the Mineral Resources Division of the Geological Survey, E. F. Burchard has been acting in their places.

O. B. Hopkins, of the Geological Survey, spent his vacation at Harrisonburg, Va., last month.

Guy Mitchell, administrative officer of the Geological Survey, spent his annual vacation at Lovettsville, Va., during September.

T. P. O'Hara, secretary to George Otis Smith, of the Geological Survey, visited Montclair, N. J., as a part of his vacation trip.

E. S. Bastin has returned from six months in the field in the interest of the United States Geological Survey.

S. B. Flagg, fuel engineer of the Bureau of Mines, with headquarters at Pittsburgh, was in Washington last month conducting tests on coal destined for use by the Agricultural Department.

Dr. Charles L. Parsons, of the Bureau of Mines, will return from a Western trip October 10.

Prof. Charles A. Davis, of the Bureau of Mines, has returned from field work in Maine and Michigan.

J. M. Hill of the Geological Survey, has returned from a trip to New York on Survey business.

B. H. Lane, assistant editor of the Geological Survey, has returned from a vacation visit with relatives at Middletown, Ohio.

F. M. Bannon, topographical engineer, who has been extending triangulation for the Geological Survey in Idaho, is ill at Mackay, in that State. It was necessary to operate for appendicitis. He is now much improved, it is reported.

CALIFORNIA SHIPPING MAGNESITE TO EAST IN UNPARALLELED VOLUME

For the first time in the history of trans-continental transportation important movements of magnesite have taken place from California to Eastern steel works. It is promised that this business will continue in increasing volume.

Prominent among the shippers is Samuel Goldbier, Exchange Bldg., San Francisco.

BUREAU OF MINES WORKING ON BREATHING APPARATUS

Encouraging results are being obtained from tests being made by the Bureau of Mines of the oxygen breathing apparatus invented by W. E. Gibbs, of Columbia University, who was employed by the Bureau for this specific purpose.

Extensive tests of the apparatus just have been completed by Dr. Yandell Henderson, of the Yale Medical School, Chief Mining Engineer Rice, and other engineers of the Bureau, on Pike's Peak.

Mr. Henderson finds that a man can undergo almost normal exertion in the rare air of the high altitude by using the apparatus.

Patents on the breathing device are pending. Mr. Gibbs turns them over to the Government as fast as he develops them.

The Bureau of Mines is very anxious to perfect American breathing apparatuses which will answer all the requirements of mine-rescue work. At present the Bureau is dependent upon European manufacturers for this equipment. Owing to the war, difficulties have arisen in the delivery of the apparatus, which has emphasized the necessity of manufacturing it in this country.

EXPLAINS CHEMISTS' IDEA OF TRADE COOPERATION

A. H. Weed, Secretary and Counsel, Manufacturing Chemists' Association of Boston, Mass., explains the advantages of his bill providing for cooperation in meeting foreign competition, as follows: "Our association, upon request from Washington, prepared a tentative form of a bill necessary to permit the kind of cooperation contemplated. The bill is premised upon the idea that the law should give the absolute and unqualified right to American manufacturers to cooperate for export trade. The effect of such cooperation, whether it be by agreement, combination or association, is to be found primarily in the foreign markets where such agreements, combinations or associations are to be carried out. If the laws of the foreign country permit such cooperation and if our foreign competitors are all acting in combination, within these foreign markets, we should have the right to meet that competition on equal terms. In other words, our anti-trust laws should have no extra territorial effect.

"On the other hand, to prevent any abuses which might result from such cooperative movements, any retroactive effect which a combination might have to restrain trade in the United States, the bill has a provision granting power to the Federal Trade Commission, similar to the power which it now possesses, to restrain unfair methods of competition, under Section 5 of the existing law. The proposed bill, therefore, defines export trade on the one hand and trade within the United States on the other."

Quicksilver Report About Ready

A report upon quicksilver by H. D. McCaskey, of the Geological Survey, has been completed and will be published shortly.

Philadelphia New York Boston Pittsburgh Buffalo Altoona Mauch Chunk

WHITNEY & KEMMERER

SHIPPERS OF THE FOLLOWING COALS:

LEHIGH

Pardee Bros. & Co.'s

LATTIMER

Harwood Coal Co.'s

HARWOOD

SANDY RUN

Buck Mountain Vein

FREE-BURNING

Alden, Wyoming,

Oak Hill,

Mt. Jessup,

Corbin,

Wilkes-Barre,

Moosic Mountain

LEHIGH & WILKES-BARRE COAL CO.'S

HONEY BROOK

WILKES-BARRE

PLYMOUTH

Also

PHILADELPHIA &

READING COAL &

IRON CO.'S

VARIOUS COALS

Shippers of Following Bituminous:

GRASSY RUN (Big Vein)

RICH HILL (Cambria Co.)

FEDERAL (Smokeless)

LILLY VALLEY (Smithing)

GEORGES CREEK

BULAH

ALSO GAS COAL AND COKE

Shipments to All Points via Either Tidewater or All-Rail

143 LIBERTY STREET

NEW YORK

STEPHEN GIRARD BUILDING

PHILADELPHIA, PA.

SUSQUEHANNA COAL CO.

MINERS AND SHIPPERS

SUPERIOR ANTHRACITE

GENERAL OFFICE:

907 COMMERCIAL TRUST BUILDING

PHILADELPHIA, PA.

Sales Offices:

NEW YORK	-	-	-	-	-	-	-	-	-	No. 1 Broadway
PHILADELPHIA	-	-	-	-	-	-	-	-	-	1436 Commercial Trust Bldg.
CHICAGO	-	-	-	-	-	-	-	-	-	1305 Old Colony Bldg.
ERIE, PA.	-	-	-	-	-	-	-	-	-	210 Marine Bank Bldg.
BALTIMORE	-	-	-	-	-	-	-	-	-	100 Chamber of Commerce Bldg.
WILLIAMSPORT, PA.	-	-	-	-	-	-	-	-	-	1, 2 & 3 Hart Building

LEYNER-INGERSOLL WATER DRILL



If you are looking for a Rock Drill that will do better than any you've ever had, the Leyner-Ingersoll is what you want.

Its record of accomplishment in both mining and tunneling is a long and successful one.

On its list of users may be found such companies as the Calumet & Hecla, the Homestake, the Hollinger Mines, Nevada Consolidated, New Jersey Zinc Co., Cleveland Cliffs, Monroe Iron Mining Co., Hardaway Contracting Co., Jenkins Contracting Co., attesting to its superior qualifications.

DISTINCTIVE FEATURES

Hammer Drill Principle, giving rapid drilling. Simple Chuck, simplifying operation. Sergeant Rotation, eliminating stuck steel trouble. Butterfly Valve, non-freezing, rapid. Automatic Lubrication, preventing undue wear. IRCO Metal Cylinder, practically unbreakable in service.

The Leyner-Ingersoll Drill will put in a greater footage of hole per shift, and keep it up longer, with less cost for repairs, power and labor, per foot of hole drilled, than any other rock drill.

WRITE FOR BULLETIN NO. 4020

INGERSOLL-RAND COMPANY

OFFICES THE WORLD OVER

NEW YORK

LONDON

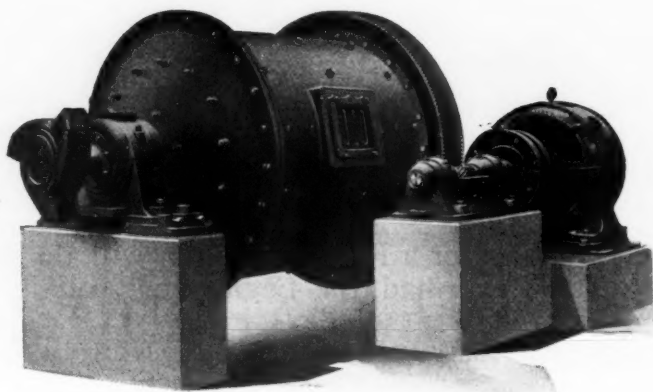
This Mill Can't Pump Itself Dry

WHY?

Because it is fitted with the

"G-H" Variable Discharge Diaphragm

which operates independently of the feed



THEREFORE

No excessive power consumption

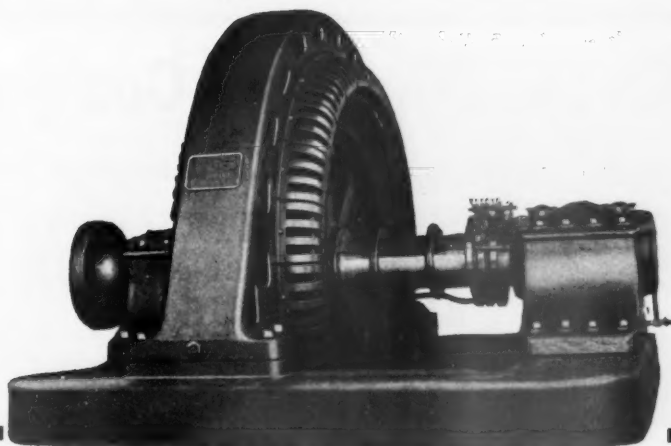
No excessive ball consumption

No excessive lining consumption

No breakage of balls or pebbles

Allis-Chalmers Manufacturing Company
MILWAUKEE, WIS.

Offices in all principal cities



Over twice as large as any A. C. hoist motor in America

An 1800 h. p. G-E alternating current hoist motor and control equipment has been ordered by the Tennessee Coal, Iron and Railroad Co. for the following duty:

Hoist unbalanced.	
Length of haul (maximum).....	5280 ft.
Angle between shaft and horizontal (average) approx.	40 per cent.
Weight of skip or cage.....	13440 lbs.
Weight of ore per trip.....	26880 lbs.
Size of rope.....	1 $\frac{3}{4}$ lbs.
Diameter of drum.....	12 ft.
Average rope speed in feet per minute.....	2700 R.P.M.
Time for acceleration.....	15 sec.
Time for constant running (5280 ft. level).....	106 sec.
Time for retardation.....	8 sec.
Rest for period (loading).....	30 sec.
Number of tons (long) per hour (max.).....	150
Number of tons (long) per hour (average).....	100

*Complete bulletins describing mine hoist equipment
will be sent on request*

General Electric Company

General Office: Schenectady, N. Y.

District Offices in:

Boston, Mass.
Cincinnati, Ohio

New York, N. Y.
Chicago, Ill.
St. Louis, Mo.

Philadelphia, Pa.
Denver, Colo.

Atlanta, Ga.
San Francisco, Cal.

Sales Offices in all Large Cities

5727

Thorne, Neale & Company

Incorporated

601-610 Stephen Girard Building, Philadelphia, Penna.

Temple Collieries—
Harry E., L. V.; Forty
Fort, L. V.; Mount
Lookout, L. V. or D.,
L. & W.; Lackawanna,
D., L. & W. or Erie.

Schuylkill Collieries—
Buck Run, P. & R.;
New Castle, P. R. R.

ANTHRACITE AND BITUMINOUS COALS

Agents for
Pardee Bros. & Co.
Lattimer-Lehigh

Bituminous—Sonman
Shaft, "B" Vein; Son-
man Slope, "E" Vein.

Sonman Smithing—1½-inch Screened, Low Sulphur, Spongy Coke
SHIPMENTS—RAIL OR WATER

CHAS. E. FERNBERG, *General Sales Agent*
New York Office: 17 Battery Place

Baltimore

Boston

Chicago

Buffalo

Mauch Chunk

Cable Address: "THORNEALE"



DICKSON & EDDY

17 BATTERY PLACE
NEW YORK

Shippers of Celebrated

Scranton Coal Company's Hudson Coal Company's

COALS

WM. C. BLODGETT, *Western Agent*
BUFFALO, N. Y.



AGENCIES

GLOBE COAL CO., Chicago, Ill.

A. S. AUSTIN, Milwaukee, Wis.



"Safety First"

IN COAL CUTTING Calls for Use of the Goodman Shortwall Mining Machine



A Chain Guard protects the men in all operations of moving, sumping, etc. Telescopes back into base as cutter arm enters the coal. Serves as a guide frame for sumping in difficult situations.

Every movement of the machine is made by power.

Men ride on the cable reel trailer truck when traveling. The reel automatically pays out and picks up the cable in entering and leaving rooms.

Cable reel on separate trailer enables operation on sharp curves and in close quarters.



Our Bulletin 103-M

**GOODMAN MANUFACTURING
COMPANY**

Chicago, U. S. A.

(36)

Pittsburgh
Cincinnati

Charleston, W. Va.
Nashville

Birmingham
Denver

St. Louis
Seattle

What Is Saved Is an Asset What Is Lost Is a Liability

Saving the maximum amount of values from ore increases profits.

Easy profits accrue as a result of judicious investments.

An air Concentrator represents an investment which returns large dividends.

It conserves ore.

It reduces waste to the minimum.

It does away with the use of water for concentrating purposes.

It is economical to operate.

We assay for all minerals.

Write today for full particulars.

**The NATIONAL
Manufacturing &
Constructing Co.**

Orrville :: :: Ohio

A Typical Installation of Jeffrey Belt Conveyor and Tripper



Jeffrey Rubber Belt Conveyers Stand the "Test of Severe Service"

In the Gold Fields of South Africa and the Klondyke of Alaska, in Coal and Metal Mines all over the United States, they have proved their ability to successfully fulfil the rigid requirements of this field of industry.

As a result of our many years of experience, Modern Improvements, unsurpassed by any other line of conveying equipment, are incorporated in the Design and Construction of Jeffrey Belts, Carriers, Trippers, Brushes, Loaders, etc.

Bulletin No. 167-58 shows their wide application and pictures many interesting installations.

Catalog No. 83-58 tells all about our entire Line of Elevating, Conveying, Screening, Crushing, Pulverizing and Power Transmission Machinery.

Write for these interesting Books.

JEFFREY MFG. CO., 958 N. Fourth St., COLUMBUS, O.

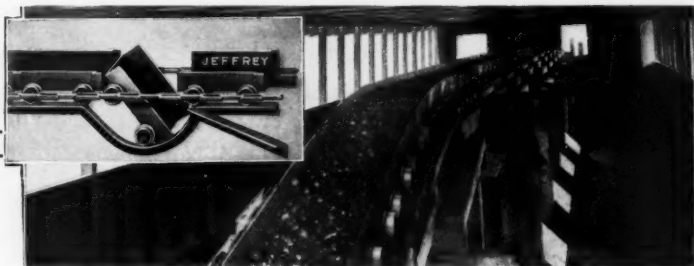
NEW YORK
BOSTON

PHILADELPHIA
PITTSBURGH

CHARLESTON, W. VA.
CHICAGO

BIRMINGHAM
MONTREAL

WESTERN BRANCH: 1129 First National Bank Building, DENVER, COLORADO



Overlapping Drop Pan Carrier for Ores, Earths, Coal, etc., showing method of dumping between terminals

(10-15)

